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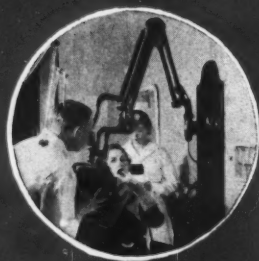
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# What Twelve Hundred Patients Know About Dentistry\*

FOR SEVERAL YEARS there has been considerable discussion regarding the "education" of the dental public. Intermittently this discussion grows into active agitation by interested groups. Plans are born hurriedly and die promptly; but at a low or high pitch, the discussion prevails. Almost everyone agrees that some ethical form of public enlightenment on all health subjects is desirable. The method of launching this type of educational project has been the chief problem. The problem has never before been systematically approached.

Any educational undertaking must begin from a known level of educational standards and needs. In the

education of the dental public, then, the question is, "To what must the public be educated?" To put it another way, "How much does the public know about dentistry and how much must it be taught?" When this question has been asked, a further question presents itself: "Do all sections of the population require the same type and amount of education?" The answers to these questions, it was believed, could be found only by going direct to the public. To that end the editorial director of ORAL HYGIENE PUBLICATIONS first sought the cooperation of twenty-five dentists whose practices represented a geographic and typical cross section throughout the United States. It seemed likely that some of the dentists would find it inconvenient to participate; therefore, thirty-seven were asked to cooperate to make sure of a minimum acceptance of twenty-five. All accepted the proposal. This accounts for some overlapping in localities but at the same time serves as verification of the results. The method of conducting the survey will be readily understood from the following letter and the accompanying instructions sent to the participants:

I am asking twenty-five practicing dentists throughout the country to help us make a study from which we hope to gain some knowledge of exactly how much the public knows about the subject of dental health. I am carrying out this study in my own practice as well.

We have compiled twelve simple tentative questions, in the language that should be understood by the average patient, and if you will cooperate by having your patients answer such questions when the questionnaire is finally completed, I am sure that this study will be of some value to the dental profession. This investigation is being made as an independent study, and you may be sure that there are absolutely no commercial entanglements.

In the event of any publication of this

material, credit will be given to the dentists who cooperate in conducting this study.

Briefly, this is what I would like you to do:

First, we will supply you with sixty copies of the final draft of the enclosed questionnaire. We would ask you to start on a definite day and give your copies to the first fifty adult patients whom you see in your office irrespective of whether they are new patients, old patients, prompt-paying patients, intelligent patients, or what not. The extra ten copies are being sent in the event that some are wasted.

Second, I would ask that the patient sit down in the reception room and take as much time as can be allowed to answer these questions. Under no condition should the dentist or his assistant aid or prompt the patient in replying.

Third, to remove any embarrassment that the patient may have which might be occasioned by lack of knowledge on the subject, we will send you fifty self-addressed stamped envelopes in which each patient may enclose and seal his own questionnaire. This will assure the patient that no one will know which were his answers, and it will make it more convenient for you to mail the returns; moreover, you will be able to mail them as they are answered instead of waiting until the fifty are ready.

We are sending you herewith a self-addressed stamped envelope in which we would like you to reply to us as to whether you will cooperate. In this envelope you may also enclose any suggestions you may wish to offer regarding the wording or content of these questions.

We hope we will hear from you promptly that you will cooperate, and when we do, we will send the sixty copies of the questionnaire and the fifty self-addressed stamped envelopes to you.

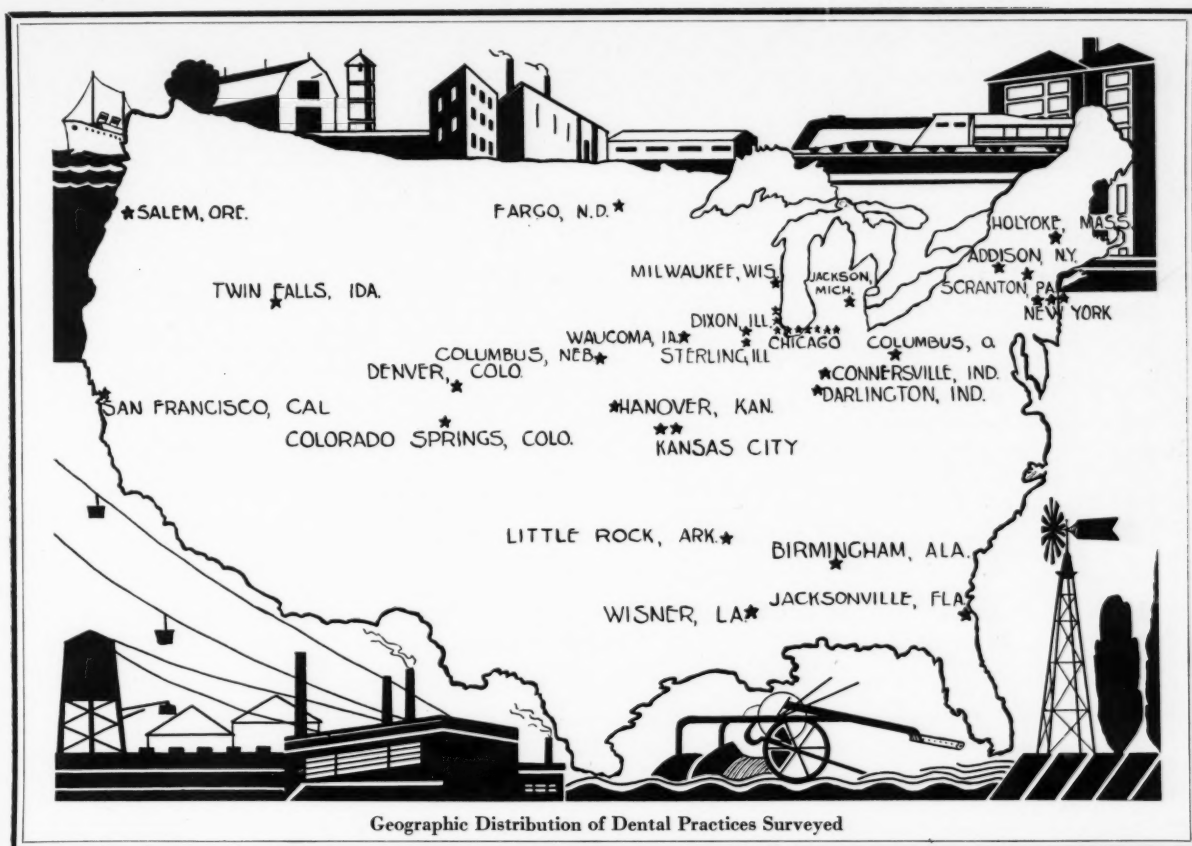
Sincerely yours,

EDWARD J. RYAN, D.D.S.  
Editorial Director

When all the acceptance letters had been received, suggestions were sent to each dentist along with the questionnaires and envelopes:

\*A study conducted by the Editorial Staff of THE DENTAL DIGEST in cooperation with the following thirty-seven practicing dentists whose names are given in alphabetical sequence:

R. M. Appleman, Columbus, Ohio  
Robert K. Baxter, Chicago, Illinois  
P. H. Belding, Waucoma, Iowa  
Carl E. Brasmer, Evanston, Illinois  
S. Joseph Bregstein, Brooklyn, New York  
C. P. Cleveland, Jacksonville, Florida  
Kent K. Cross, Denver, Colorado  
Willard T. Farmer, Birmingham, Alabama  
Winfield S. Fisher, Elmhurst, Illinois  
John J. Fitz-Gibbon, Holyoke, Mass.  
Lloyd I. Gilbert, Fargo, North Dakota  
Irving R. Hardy, New York, New York  
David Bennett Hill, Salem, Oregon  
Frank J. Hurlstone, Chicago, Illinois  
Leon R. Kramer, Hanover, Kansas  
Saul Levy, Scranton, Pennsylvania  
Don C. Lyons, Jackson, Michigan  
William E. Mayer, Evanston, Illinois  
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Wilber E. Mecum, Wisner, Louisiana  
Samuel Charles Miller, New York, New York  
Scott Morrison, San Francisco, California  
Graves Peay, Little Rock, Arkansas  
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Edward G. Robbins, Evanston, Illinois  
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Amos G. Stiker, Addison, New York  
G. J. Tilley, Chicago, Illinois  
Stanley D. Tylman, Chicago, Illinois  
N. E. Uelmen, Milwaukee, Wisconsin  
N. G. Wills, Connersville, Indiana  
R. E. Worsley, Dixon, Illinois  
Earl H. Zimmer, Colorado Springs, Colo.



### Suggestions for Conducting the Oral Hygiene Publications Public Health Study

1. As soon as the package containing the questionnaires and return envelopes has been received, you may begin the survey.
  2. The patient is not to be prompted by anyone in any way.
  3. The answers must be written in the dental office. Patients are not to take the questionnaires home for reply.
  4. The patient should be given as much time as possible to write his answers.
  5. Each patient is to be permitted to enclose his own questionnaire in the envelope provided him and to seal the envelope himself.
  6. The dentist is asked to mail each questionnaire as he receives it rather than wait until he obtains the fifty replies.
  7. Questionnaires should be given to the first fifty adult patients, consecutively, as they come to the office, without any attempt at selection.
- N. B. Please bear in mind that if the results of this study are to reflect accurately what the dental opinions of patients are, it is necessary to comply with these instructions.

The accompanying map shows the geographic distribution of the dental practices included in the survey; it likewise suggests the broad variation of the occupations engaged in by the participating patients. It is readily seen that great industrial centers and agricultural communities were included as well as smaller cities and small towns. Although we have no direct evidence regarding the educational backgrounds and oc-

cupations of the persons answering the questionnaire, we have reason to believe from the character of the replies that some of the patients were barely above the level of illiteracy whereas others show every evidence by their answers of superior educational background. Incidentally, no attempt was made to edit the wording of the replies as given in the tables, because it was felt that the exact expressions revealed the

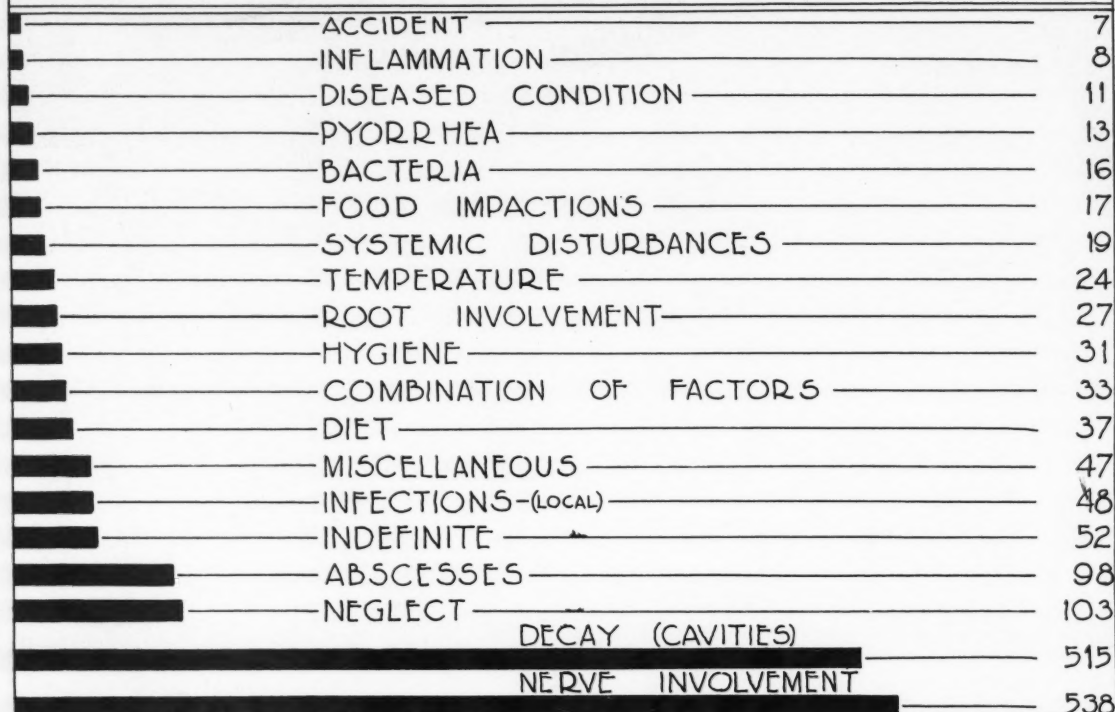
educational levels of those replying.

It is recognized that a sample of 1200 is comparatively limited; nevertheless such a sample is sufficient to represent a true and accurate cross section of the opinions of patients found in typical dental practices. The replies given by these patients represent the opinions of persons who are experienced as dental patients and have been conditioned to think in dental terms. It seems reasonable to conclude that the response of persons conditioned to the dental experience would be more intelligent than the response of those who had never been in a dental office.

Although this study probably represents a true picture of the opinion of dental patients, it presumably does not represent a true picture of the attitude of the general public toward dentistry. The level of knowledge about the subject among the general public is probably lower than the replies of the conditioned dental patients indicate. Those who re-



## WHAT DO YOU THINK CAUSES A TOOTHACHE?



sponded to this questionnaire were those experiencing modern dental treatment in modern dental offices by well trained dentists.

### Scope of the Study

The questionnaire, called A STUDY FOR PUBLIC HEALTH, included twelve questions. Questions eleven and twelve contained two parts. Every precaution was taken to make the wording simple and clear, so that it would not be susceptible of misinterpretation; nevertheless, a few patients did occasionally misunderstand the intent of the question. That was expected but was not sufficient to be of any significance; although, as will be seen in Charts 4 and 11 A such replies have been classified accordingly. The questions asked will demonstrate the scope of the study; or, in other words, the subjects about which an attempt was made to find out the accuracy of the conceptions of dental patients.

These questions are listed herewith:

1. What do you think causes a toothache?
2. Of what use is an x-ray of the teeth?
3. What do you think causes tooth decay?
4. Would you like an injection of a local anesthetic while having a tooth drilled?
5. What is your understanding about pyorrhea; in other words, what do you think it is?
6. How long do you expect dental work that has been done (fillings, bridges, for instance) to last?
7. What relation do the teeth have to general health?
8. Do you think of an extraction of a tooth in the same way as you do of an operation?
9. What do you expect a toothpaste or toothpowder to do for you?
10. Do you think it is necessary to fill cavities in the "first" ("baby" or "temporary") teeth?

11. Are crooked teeth and poorly developed jaws in children something that they "outgrow"? What are your opinions?

12. What do you think brings about the need for artificial teeth? Do you think it is "just one of those things" that comes with advanced age?

A space was provided on the back of the questionnaire for *Remarks*. These will be treated separately later.

### Method of Tabulation

As the questionnaires were received the replies to each question were separately recorded. Frequently two or three answers were given to a single question. These were treated as individual replies in order to facilitate tabulation. The number of different and separate answers to each question, therefore, could and did go well over twelve hundred or the total

(Continued on page 12)

# TABLE 1—WHAT DO YOU THINK CAUSES A TOOTHACHE?

ORIGINAL CLASSIFICATIONS: 162

TOTAL REPLIES: 1644

## 1. Nerve Involvement: 538

Exposed nerve, 261; neuralgia, 7; pressure on nerve, 32; decay down to nerve, 147; germs attack nerves, 2; diseased nerve, 6; infected nerve, 16; irritation of a nerve, 32; dying nerve, 9; dead nerve, 6; nerves, 5; dead tooth, 1; disturbance of nerve supply, 1; dying tooth, 1; "something" affects nerve, 1; Nature's signal, 3; inflammation of nerves of gums, 1; reflex, 2; infection or congestion of membranes around nerves, 1; an infection in a tooth which has affected the nerve, 1; sympathy for another aching tooth, 1; a non-vital tooth, 2.

## 2. Decay (Cavities): 515

Cavities, 474; decayed enamel, 2; break in enamel, 9; broken teeth, 13; incipient decay, 1; tooth that needs filling, 4; decay in tooth caused by too large a filling, 1; bacteria in a cavity, 4; hole in a tooth allowing food to collect causing decay, 4; holes of broken teeth, 1; tooth rotting to gum, 1; decay working into vital parts of tooth, 1.

## 3. Neglect: 103

Neglect, 64; repair of fillings neglected, 5; should be fixed before they ache, 1; neglecting visits to the dentist, 22; not having a dentist look at the teeth often enough, 3; improper care of teeth in childhood, 2; improper care, 4; neglect of small cavities, 1; allowing teeth to be neglected, 1.

## 4. Abscesses: 98

Abscesses, 97; a filled tooth that is abscessed, 1.

## 5. Indefinite: 52

Different things, 1; no answer, 19; bad teeth, 13; do not know, 8; never had one, 1; something radically wrong with teeth or gums, 1; film, 1; severe pain in the tooth, 1; I don't know but I think it is something wrong with the teeth, 1; some abnormal condition within or around the tooth in question, 1; whenever something gets wrong with a tooth it aches, 1; some abnormal disturbance or condition that manifests itself within or upon the teeth, 1; if I knew, I wouldn't have one, 1; trouble in a tooth, 1; disturbance in tooth structure or surroundings, 1.

## 6. Infections (Local): 48

Infected tooth, 16, infection, 21; infected gums, 11.

## 7. Miscellaneous: 47

Trench mouth, 1; ulceration, 1; ulceration of a tooth, 1; proximity of two opposite metals, 1; poison, 1; disturbance of normal tooth function, 1; decay in a tooth caused by too large a filling, 1; poor dentistry, 4; vibration or trauma from chewing, 1; pus forms a gas and tooth aches until air is let in, 1; functional disorders of teeth or gums, 1; traumatic occlusion, 1; unbalanced teeth (malocclusion) 2; according to Robert Burns "a toothache is the Hell o' a' diseases." 1; improper paste, 1; acidity causes the walls to crumble and the teeth to become soft, 1; infection or congestion of membranes around nerve which comes from decay of surface of tooth, 1; impacted teeth cause pressure, 15; obstruction of wisdom teeth, 1; infection of pulp, 1; tender gums, 2; exposed neck of tooth, 1; an exposure of a vital part of a tooth, 1; poor tooth structure, 4; depends on whether you are gifted with hard or strong teeth, 1.

## 8. Diet: 37

Eating candy, 1; indigestion from eating too much

sweets, 1; biting on hard things, 1; too much sweets, 12; foods that don't agree with a person, 2; inadequate diet, 9; sugar diet deficiencies, 4; poor diet when young causes poor teeth, 1; biting on something hard, 1; wrong foods cause cavities, 1; not eating coarse enough foods, 1; because you don't eat enough vegetables, 1; not giving children the proper nourishment when babies, 1; sometimes eating too much candy, 1.

## 9. Combination of Factors: 33

Eating candy and not cleaning teeth, 3; germs due to improper cleaning, 10; food that is cleaned off teeth causes decay, 3; gas pressure on nerves from decaying membrane; wearing off of enamel and decay of tooth, 2; infection of tissue where nerve is exposed or destroyed, 1; decay of vegetable or organic matter which gets into a tooth by means of a chemical reaction on the tooth itself causing a cavity and finally infection to nerve, 1; breaking down of enamel exposing dentine to air, 1; it is either a natural defect or caused by strong medicine, 1; acids given off by decaying substances irritate the nerve and cause an increased flow of blood to the pulp cavity, 1; wearing off of enamel and decay to tooth, 2; irritation of the nerves in a tooth caused by cavity or infection in nerve tissue or gums, 1; decay and wearing away of teeth exposing nerve, 1; crowding of teeth; irritation, 4; exposure of the nerve endings after erosion, 1.

## 10. Hygiene: 31

Improper cleaning, 30; unclean teeth, 1.

## 11. Root Involvement: 27

Pus at the roots of a tooth, 8; decay of the root, 5; infection at the root of a tooth, 11; a gas that is formed in the root of the teeth, 1; infection in root canals, 1; exposed root, 1.

## 12. Temperature: 24

Extremes of temperature on sensitive spots, 17; cold in decayed spot, 6; extreme cold, 1.

## 13. Systemic Disturbance: 19

Poor health, 10; glandular disturbance, 1; sinus, 1; sinus trouble, 1; systemic infection, 2; infection in the blood, 1; colds, 2; excitement, 1.

## 14. Food Impactions: 17

Food in a cavity, 14; food pressing down on root, 1; food particles caught in the gums, 1; impacted food particles, 1.

## 15. Bacteria: 16

Germs due to improper cleaning, 10; bad germs, 1; bacteria from decayed tooth particles, 3; germs, 1; bacteria destroy the enamel and get at the under tooth, 1.

## 16. Pyorrhea: 13

Pyorrhea, 10; loosened tooth due to pyorrhea, 1; pus pockets, 2.

## 17. Diseased Condition: 11

Diseased condition, 7; a diseased tooth, 4.

## 18. Inflammations: 8

Inflammation, 3; inflammation in tooth, 2; inflammation in surrounding tissues, 3.

## 19. Accident: 7

Accident, 3; injuries (blows, etc.) 4.

## OF WHAT USE IS AN X-RAY OF THE TEETH ?

GERMICIDE	2
PICTURE	3
MISCELLANEOUS	6
PREVENTIVE DENTISTRY	7
CURE OR CORRECTIVE	10
RELATION TO BONE	27
INDEFINITE OR UNCERTAIN	37
DIAGNOSTIC AID:	1425
SKEPTICAL	9
ABSOLUTE RELIANCE	77
GENERAL	625
SPECIFIC	714

number of questionnaires returned. It was thought best to treat the replies in this way, so that each conception or opinion concerning dentistry could be individually studied.

According to this method, for example, there were 1644 replies to the first question, "What do you think causes a toothache?" These 1644 replies were first tabulated under 162 classifications. When these classifications were completed for all the replies to each of the questions, the detailed classifications for each question were then combined and grouped under more inclusive and less specific headings. This was done to make possible graphic presentation of the large variety of patient attitudes, opinions, and information on each of the dental subjects covered in the study. Thus the 162 classifications of the replies to the first question were arranged in nineteen groups. Chart 1 illustrates these nineteen major divisions for the first

question. The original detailed classifications for the first question are shown in Table 1.

There were 1517 replies to the second question, "Of What Use Is an X-Ray of the Teeth?" These gave 194 classifications which were later grouped into eight divisions. The group under the heading "Diagnostic Aid," had four subdivisions. These subdivisions were necessary to demonstrate the shadings or distinctions (in so far as these could be ascertained) intended by the patients in replying as they did (Chart 2 and Table 2).

The method of classification and tabulation will now be clearly understood for the remaining questions as outlined in all the accompanying charts and tables. The procedure is the same and applicable for each question throughout the study. The number of replies to each question and the number of classifications in

the original tabulations are given at the head of each table.

### Interpretation of Response

1. *What Do You Think Causes a Toothache?*—On the whole the reaction to this question may be considered good. The association between dental caries and involvement of the nerve structure was recognized by virtually all the patients. Neglect was recognized in 103 replies. In no case was there recorded what might be called a medieval response. It is true that many replies were conditioned by personal experience. A patient, for example, might have had a toothache develop after he ate candy, which caused him to fall into the error of generalizing that all toothaches were due to eating sweet stuffs. Other patients experienced a toothache following thermal changes, hot and cold foods, for example, which caused them to conclude that toothaches were due to

(Continued on page 14)



## TABLE 2—OF WHAT USE IS AN X-RAY OF THE TEETH?

ORIGINAL CLASSIFICATIONS: 194

TOTAL REPLIES: 1517

### 1. Diagnostic Aid: 1425

#### a. Skeptical: 9

Not much; probably helps the dentist in some way, 1; dentists say now that the x-ray tells little in regard to teeth, 1; merely to satisfy the patient; I have had x-rays made that were a waste of money, 1; to determine condition of roots and locate pus pockets (not dependable) 1; supposedly identifies decay, 1; it shows what is going on inside (sometimes). Care should be taken in interpreting what is shown. Sometimes shadows are confusing. When color photography is perfected we may know more, 1.

#### b. Absolute Reliance: 77

Shows definitely the condition of the mouth and teeth, 33; fully explains cause of the trouble, 28; shows exact source of infection, 1; it is the only definite means of determining source of gum trouble, 1; it shows what needs to be done without experimenting, 1; to determine just what can be done toward saving teeth, 1; to tell exactly what tooth is causing the trouble, 1; the safest way of finding the trouble, both for patient and dentist, 1; to locate definitely the diseased tooth and gum, 1; gives exact condition of them before having them worked on, 1; the Best invention for getting at the bottom of the Worst trouble, 1; shows exactly where the trouble is and prevents needless extraction, 3; the only way to show the true condition of a tooth, 1; to show the exact disease of the tooth, 1; a complete picture, does away with hit and miss practice, 1; to extend the examination and to verify the findings, 1.

#### c. General: 625

Locates affected parts, 1; determines condition and position of troubled parts, 1; see cause of disease, 1; shows definitely the condition of mouth and teeth, 33; see inside teeth and gums, 11; aids dentist in diagnosis, 140; to find the cause of a toothache, 1; see condition of teeth (bad or good), 97; shows hidden conditions, 36; extraction aid, 35; locates the trouble, 35; discloses the trouble, if properly done, 1; disclose abnormal condition of growth, 18; shows trouble below surface, 18; shows what's wrong, 13; determine internal condition of teeth, 9; to see what's the matter, 2; detects faults, 13; shows where the cause lies, 1; to determine present or possible future trouble, 1; to show how many bad teeth you have, 1; to show what is going on in the gums, 5; to see how they are at the bottom, 2; to see diseases that affect the teeth and mouth, 4; shows doubtful parts of the teeth, 1; eliminates guesswork, 7; to discover any possible defect, 3; to show what you got and what you haven't, 1; helpful in locating wisdom teeth and finding proper position of teeth, 1; to locate and prevent trouble, 2; shows actual facts about the teeth, 1; locates the place of the disease, 2; shows the cause of a toothache, parts of the tooth and mouth that are invisible to the naked eye, 47; shows decay where an instrument fails to show it, 2; to detect the beginning of trouble of teeth or gums, 1; to find the bad teeth, 1; you can sooner tell the trouble of your teeth, 1; to determine conditions not obvious otherwise, 1; to show conditions which cannot be discovered without it, 1; a partial analysis of the parts of the teeth not visible in a clinical examination, 1; detects unsound teeth which look well on the outside, 1; to know what treatment your teeth need, 1; it shows whether you have holes in them or not, 1; it develops places you cannot see or reach yourself, 1; shows up

defects in the teeth, 6; to determine the condition of the teeth or gums, 2; an x-ray shows what is causing your tooth to hurt, 1; reveals what the dentist cannot determine by examination, 1; to look where eyes cannot see, 1; gives a good working view of the teeth, 1; to see if a tooth is still healthy enough to be saved by dentistry, 1; locate tooth buds in children's cases, 1; to locate cause of unnatural condition, 1; it detects bad teeth not noticeable to the eye, 1; to find the cause of decay or pain, 1; you are more sure of knowing what to do, 1.

#### d. Specific: 714

Find hidden infections, 37; see extent of decay, 40; disclose inner cavities, 105; see roots of teeth, 40; find decayed teeth, 22; shows small cavities, 8; shows abscesses, 112; to find the beginning of cavities, 1; shows shape, location, and condition of roots, 70; finds impacted teeth, 18; shows position of teeth, 21; shows dead teeth (nerves) 13; roots that have not been extracted are revealed, 2; shows gas accumulation, 1; locate ulcers, 11; to learn cause of decay, pain, or infection, 9; locate infection, 35; locate pus pockets, 22; shows nerves that have been treated, 2; shows position of teeth in gums, 3; shows diseases below the crown, 1; to determine whether to pull tooth or not, 2; shows condition of teeth beneath the gums, 31; see condition of nerves of teeth, 2; to see whether they are diseased, 1; shows whether a tooth is worth saving, 2; finds the decayed parts, 12; to locate fractures, 1; show exact source of infection, 1; to discover diseased gums, 6; to see how your teeth really look (shape, etc.), 2; to find out the cause of trouble at the roots of teeth, 1; to reveal bad teeth that apparently look o.k., 1; to show location of the nerve, 2; to discover whether the tooth is alive or dead, 2; to ascertain point of focal infection, 1; to determine the condition of the teeth at the roots, 5; to be sure whether infected ones can be saved, 1; detects pyorrhea, 5; reveals remaining segments of extracted teeth, 2; to determine existence of infection on the roots of the teeth, 5; to determine the trouble at the root, 4; shows how tooth is set on the jaw, 1; reveals source of injury, 1; shows spaces where food particles might become lodged, 1; shows new teeth coming in and also whether roots are left after the tooth is pulled, 1; to see what teeth are pulled and if they are coming in right, 1; to see what is under previous dental work, 4; to determine pathology, 1; locates impacted teeth, 1; locates cavities between the teeth, 7; to see if there are pus pockets below the roots, a mighty fine invention, 1; to locate diseased teeth not showing from the outside but affected at the roots, 1; determines condition of roots, 17; to determine root-end disturbances, depth of pockets and cavities, 1; to discover possible sources of infection that may not be visible on the surface, 1; it tells how deep the root is, 1; to bring forth any irregularities of the teeth that might undermine the patient's health, 1; locates secondary low-grade infections which run down health, 1; shows abnormal condition of roots or gums, 1; to see if root is infected, or tangled, or if there is a third tooth, 1; to determine existence of another tooth below the one protruding, 1; shows root formation, 2; it can detect whether the infection is in the tooth only, or if it is in the root also, 1; to show where and how much a tooth has decayed, 1; reveals hidden troubles so that they can be checked before they become too serious, 1; to detect decay before noticeable on surface of tooth, 1; to watch for decay or infection otherwise invisible, 1.

## 2. Indefinite or Uncertain: 37

No answer, 25; do not know, 3; this is obvious, 1; a good use, 1; for your general health, 1; a very good thing, 1; same help to the teeth as an x-ray is to the body, 1; to see what ails it, 1; an x-ray of the teeth is of great value to both the dentist and the patient, 1; to determine the causes of the teeth, 1; the same as an electric light after dark, 1.

## 3. Relation to Bone: 237

Show bone structure and pyorrhea, 6; to study any unusual bone structure, 1; reveals condition of jawbone surrounding the teeth, 11; shows cracks in bony structure, 1; to discover infection in the bone or roots, 4; necessary in locating diseased bone and pus pockets, 1; enables dentist to see condition of bone structure, gums and parts not visible to the naked eye, 1; shows conditions of supporting tissues, 1; the x-ray gives off a light which penetrates through all but bone, and photographs this onto the plate, showing condition of bone, 1.

## 4. Cure or Corrective: 10

In early years, aids permanent correction, 1; to help correct decay, 1; to keep pyorrhea and other infections from spreading, 1; to relieve pain, 1; it gives the teeth firmer bone construction, 1; stimulate the gums, I suppose! 1; intelligent treatment or correction of trouble, 1; fix the trouble, 1; prevents pyorrhea, 1; to avoid further trouble of the teeth and also for the health of the body, 1.

## 5. Preventive Dentistry: 7

Reveals any trouble and prevents mistakes, 1; the most important means in preventive dentistry if taken by an expert technician, 1; shows trouble at an early stage so it can be checked at once, 1; a scientific study for prevention of diseases of teeth, 1; prevents useless pulling of good teeth, 1; it can detect whether the infection is in the tooth only, or if it is also in the root, 1; shows hidden trouble and often prevents further trouble, 1.

## 6. Miscellaneous: 6

Shows others what will happen to teeth, 1; the same as a good pair of headlights on an auto on a dark night, 1; saves one money if teeth are too bad to be filled, 1; it protects the patient from having good teeth extracted and assures them of better dental service, 1; it shows that which the dentist cannot detect by himself and saves health as well as beauty, 1; an x-rayed tooth can be saved sometimes, 1.

## 7. Picture: 3

To give a working picture of the tooth or teeth in relation to the neighboring dentures, 1; to give a picture of the condition of teeth, 1; a picture of the tooth from the inside, 1.

## 8. Germicide: 2

It kills the germs, 1; a germicide, 1.

(Continued from page 12)  
thermal variations. In several cases in which patients had experienced pain following a traumatic injury, they disregarded dental caries, bacterial infection, chemical changes, and temperature variations; they concluded instead that toothaches were essentially of a mechanical nature.

When an abstract question is asked it seems that an answer is arrived at by reasoning from the particular to the general in terms of personal experience. In any educational effort dentists should stress significant general truths regarding dental conditions, giving specific references to aid the public in reversing the reasoning process. If a few general prin-

ciples are taught the patient, he can apply these to his specific conditions.

2. *Of What Use Is an X-Ray of the Teeth?*—The "x-ray" was overwhelmingly accepted as a diagnostic aid of varying significance. This represents an excellent reaction on the part of the patient as to the importance of the "x-ray." It does not matter that the patient does not understand precisely what the "x-ray" shows; it is important that he recognizes the necessity for the "x-ray" and shows a willingness to have "x-rays" taken.

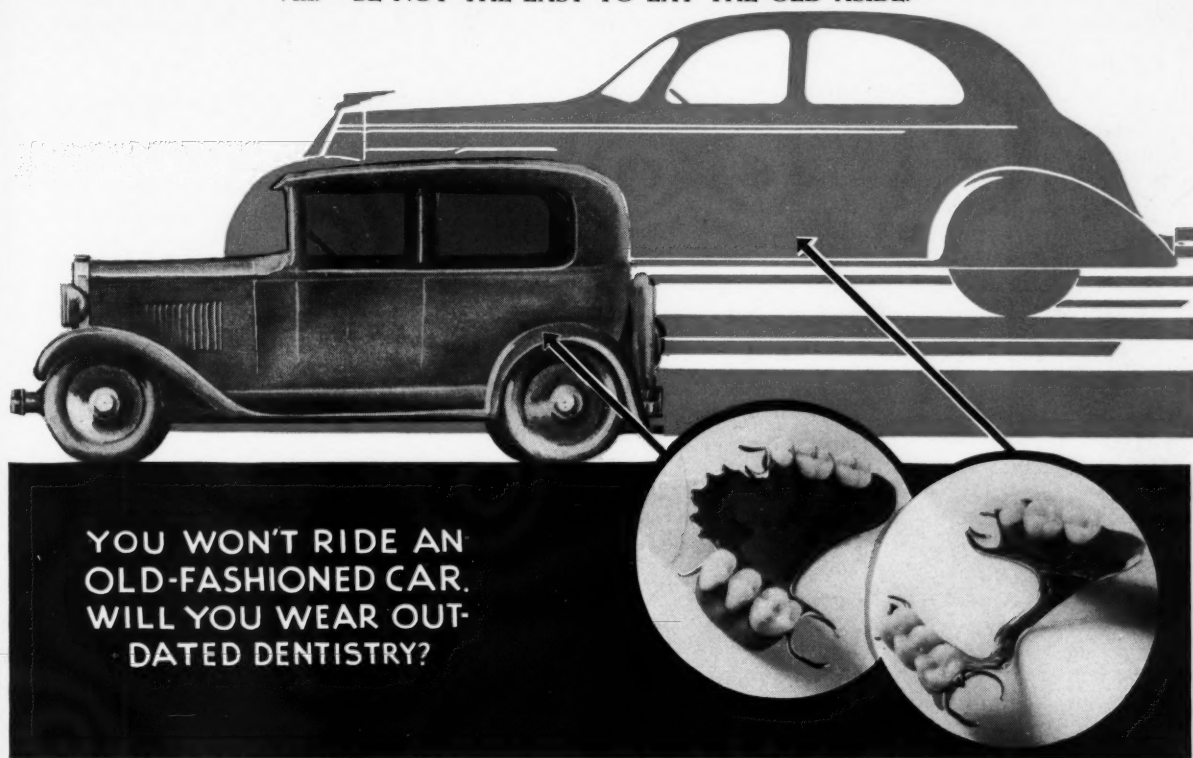
When we consider that the x-ray apparatus has been used generally in dentistry for only about twenty years, we can be encouraged by the

response of patients to this question. Only in a few instances, as the charts and tables show, did patients confuse the "x-ray" as intended here with roentgen therapy. Patients are apparently more receptive to the idea of roentgenographic examinations than many dentists are likely to concede. The extent to which patients accept the diagnostic value of roentgenograms seems to be greater than the extent to which dentists advocate routine roentgenographic examinations. The typical patient expresses a greater willingness to receive roentgenographic diagnosis than is exhibited by the average dentist to provide it.

(End of First Installment)

# The Education Of The Dental Patient

## VIII. "BE NOT THE LAST TO LAY THE OLD ASIDE."



\*This is the eighth chart in the third series intended for the use of the dentist in explaining important dental truths to his patients. The first and second series have been published in booklet form.



# The Pontic in Fixed Bridgework\*

DONALD E. SMITH, D.D.S., Hollywood, California, and HARRY R. POTTER, D.D.S., Los Angeles

THE LAST CENTURY has witnessed the development of the science of fixed bridgework from a questionable procedure in dental practice to a proved and worthy health service. Apparently, man's dietetic deviation with the subsequent loss of teeth has furnished the stimulus for this development. Will the next hundred years see humanity correct its errors and bridgework become a lost art?

The fundamentals that govern the design of a restoration should be based on biologic laws—Nature's own plan and specifications. It is logical to assume that the natural harmonious relationship of the oral structures is the standard of excellence by which to estimate the value of a restoration. Any restoration aiming to fulfill the highest dental conceptions must be an accurate physiologic, anatomic, and biologic as well as mechanical substitute for the lost members. *To replace lost teeth so that the patient may live unreminded of his loss with a minimum impairment of function constitutes the ideal in restoration.*

The occlusal surfaces and incisal edges are primarily the functioning elements of the teeth, supplemented by the cheek and tongue acting upon buccal and lingual surfaces; hence, in mastication, there is not only the crushing and tearing of food but the manipulation for further mastication and deglutition—food sweeping over buccal and lingual surfaces, missing direct impact upon the gums by cleverly arranged convexities, caught upon the buccal by the cheek activated by the buccinator muscle, and on the lingual by the more active tongue, to be returned and held between closing occlusal surfaces or swept to the roof of the mouth and swallowed.

Normally the cleansing sweep of food with its stimulus to the gums and the washing and dissolving action of the saliva should constitute the hygiene of the oral cavity. Un-

fortunately, civilization has so altered the status of the human mouth that these factors must be supplemented by the use of the toothbrush.

## Requirements of Bridgework

The outstanding fundamentals of bridgework are that they must approach these normal arrangements. A bridge must, by its occlusal surfaces restore the crushing and tearing function to a degree consistent with the strength and tolerance of the abutment teeth. It must have buccal and lingual surfaces that are accommodated to and function with shrunken ridge conditions; the bridge must be free from food-locks and areas that needlessly lodge food. Along with these requirements, esthetics must be given careful consideration. Porcelain, with its adaptability, its texture, and color, along with the remarkable tissue tolerance when properly glazed, has made the high standard of present-day bridge-work possible.

The loss of any normally functioning tooth is indeed a disaster but ruthless laceration and traumatizing of the hard and soft tissues in extraction may seriously complicate its satisfactory restoration from both the standpoint of function and esthetics. Extractions, when fixed bridgework is contemplated, must be done with great care and a minimum of injury to remaining structures. Destruction of the alveolar process leads to excessive resorption, bringing about a condition that may preclude the construction of a satisfactory bridge. An undisturbed buccal and lingual plate and gingiva that is not lacerated are the best guarantees of a satisfactory ridge condition in the future. The loss of teeth must always be followed by the loss of ridge dimension, but a minimum of shrinkage is the condition for which to hope.

## Types of Mucosa Involved

Pontic designing demands a careful consideration of the mucosa of

the ridge. Two types of mucosa must be considered: first, the gingiva, a dense tightly attached tissue distinguished by the stratum corneum

Fig. 1—Cross section of gingival tissues. Note corneous layer (stratum corneum) at A covering firmly attached tissue and at B the loosely attached mucosa and absence of stratum corneum.

Fig. 2—Line of demarcation between the two types of mucosa determined by freer movement of the loosely attached tissue.

Fig. 3—A, Incorrect application of saddle to the ridge which deprives the gingival tissues of proper stimulation. An outstanding misconception of the saddle principle. B, Correct application of saddle principle permitting physiologic stimulation and maintenance of normal stratum corneum.

Fig. 4—A, Upper incisor before extraction and its completely healed immediate restoration. Note loss of ridge dimension and reduced labio-lingual thickness of pontic. B, Upper bicuspid before extraction. Healed saddle type pontic showing reduced dimensions.

Fig. 5—Typical restoration of upper bicuspid. Note appearance of normal length and reduced dimensions of pontic.

Fig. 6—Incorrect restoration of upper bicuspid illustrating poor esthetics caused by use of pontic of same size as natural teeth. Note excessive length and closed embrasures.

Fig. 7—Correct application of anterior saddle to the healed ridge. Note depression of facing at the neck and reduced labio-lingual dimensions to give appearance of normal length.

Fig. 8—Unsatisfactory results caused by placing pontic in exact position of extracted tooth.

Fig. 9—Typical saddle and conical types of facings.

Fig. 10—Lingual aspect of short upper bicuspid restoration. Note spherical form of lingual portion of saddle and accentuated embrasures.

Fig. 11—Roentgenograms of excessively long tips and corresponding loss of bone tissue.

Fig. 12—Typical short conical tips permitting free tissue movement with maintenance of normal stratum corneum.

Fig. 13—Result of using excessively large tip pontic placed in exact position of extracted tooth.

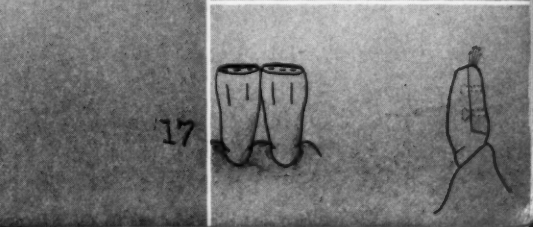
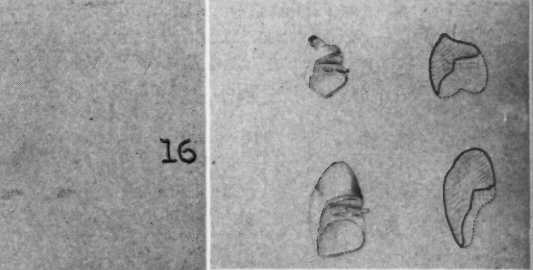
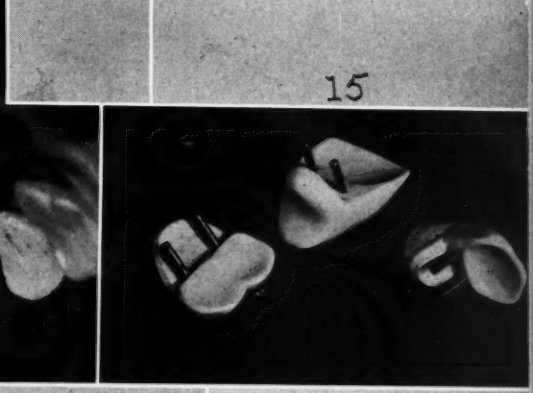
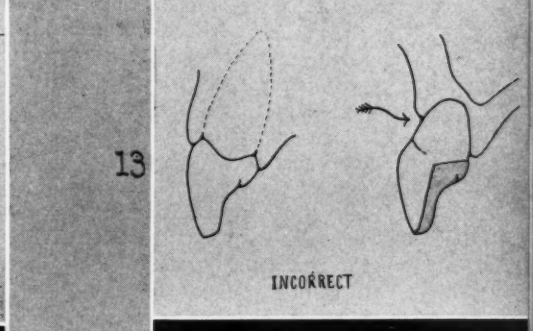
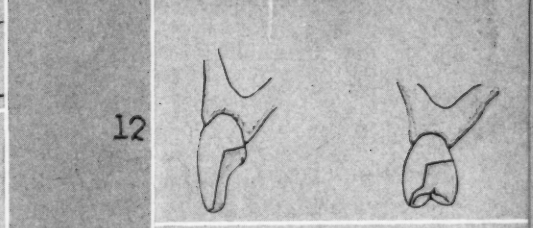
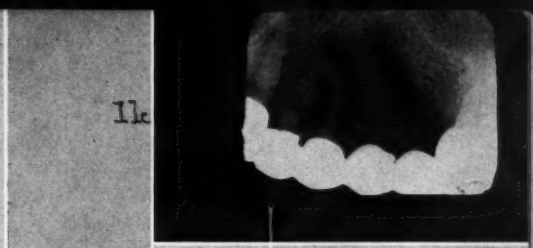
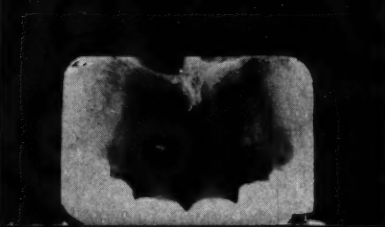
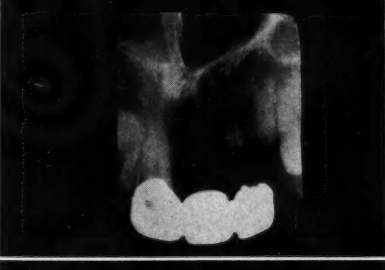
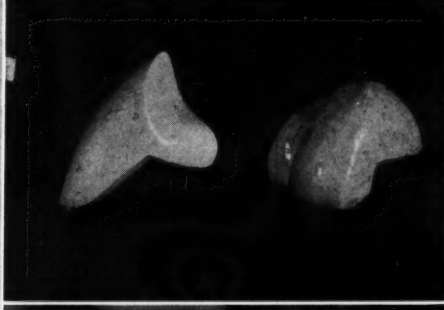
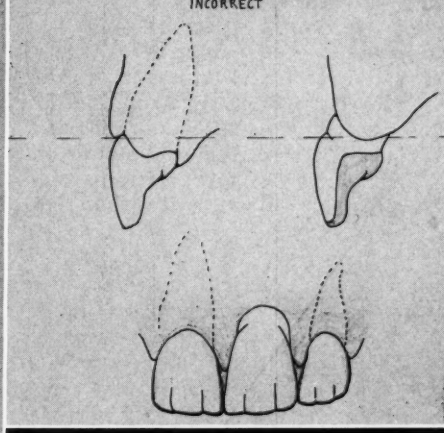
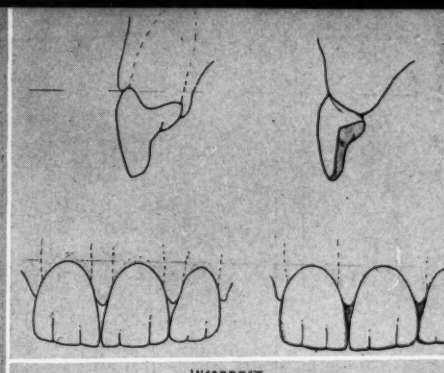
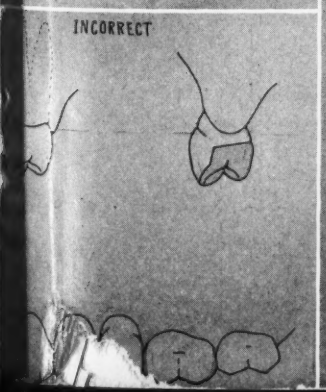
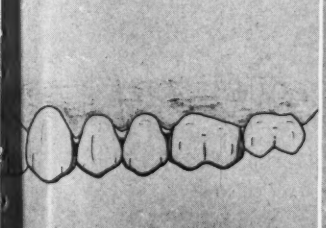
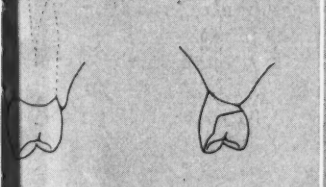
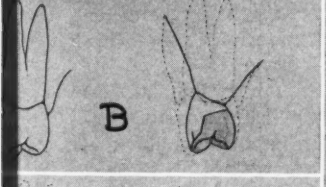
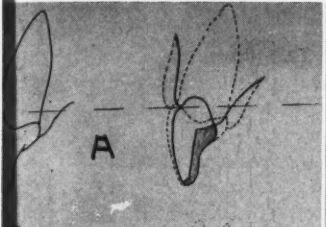
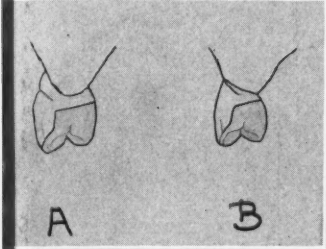
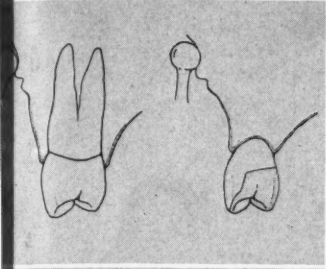
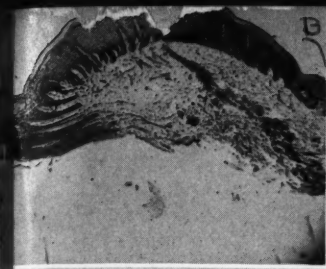
Fig. 14—Typical long-pin pontic for short bicuspid restorations. Note hollow-grinding of facing and corresponding arched reinforcement of porcelain.

Fig. 15—Various facings properly hollow-ground.

Fig. 16—Cross sections of typically hollow-ground facings. Note bulk of metal with minimum display of gold.

Fig. 17—Lower anterior pontic with normal incisal edges of porcelain. Notice gold support with light reflections cast away from observer to conceal gold display.

\*From the University of Southern California College of Dentistry.





which covers the necks of the teeth and which also covers the crest of the ridges after extraction and healing have taken place; and second, a softer, more loosely attached mucosa which is found elsewhere throughout the mouth (Fig. 1).

### Porcelain as Contacting Medium

It is necessary to consider porcelain as a tissue-contacting medium. The gingiva or gum tissue has a remarkable toleration for highly-glazed, high-fusing porcelain, and readily adapts itself to it when the pontic is properly designed. The reaction of this tissue to glazed porcelain is similar to and compares favorably with that of enamel. It is readily cleaned by the fluids of the mouth. Rarely will one find deposits or stain on glazed porcelain. When the contacting surfaces of the pontics are properly shaped and adapted, the gingival tissue responding to stimulation will often form the counterpart of the free gingiva. This is not true, however, of the other more loosely attached mucosa, and under no circumstances should porcelain ever be placed in permanent adaptation with this tissue. The definite line of demarcation may be noted by the freer movement of the softer mucosa (Fig. 2).

One of the outstanding causes of failure in the majority of modern bridge restorations is the tendency toward excessive porcelain contact with the ridge. In compliance with biologic demands that gum tissue receive constant stimulation and massage, the contacting surfaces must be reduced to the minimum consistent with esthetics and function. There should be no areas about the pontic shut off from stimulation and massage. The actual contacting surfaces of porcelain should be so reduced that the slight movement of the mucosa beneath the tip will maintain a normal epithelium and keep the tissue in a healthy, hygienic state. Excessive contact means congestion and lowered resistance with subsequent infection (Fig. 3).

### Anatomic Considerations

Anatomic considerations have to do mainly with the shape, size, and position of the pontic in relation to

the changed ridge condition. It should be remembered that the loss of teeth is followed by loss of ridge dimension (Fig. 4). Pontics must be accommodated to this shrunken, narrowed ridge. This calls for a proportionate reduction in the bucco-lingual or labio-lingual dimension of the pontics.

A reduced diameter of pontics is of primary importance if we are to obtain a smooth sweep over the buccal or labial and lingual surfaces in the course of mastication (Fig. 5). It is a common mistake to construct bridges with pontics of the same diameter as the missing teeth. This procedure is unconditionally condemned (Fig. 6). It defeats one's purpose from the beginning. Inevitable food locks; trap-embrasures with the intervening gum tissue shut off from stimulation; excessive stress upon abutments, and undue tissue contacts of the pontic—these always result. Aside from these faults, the unnatural relation of the pontic to the ridge makes satisfactory esthetics impossible. In the anterior region the reduction of the labio-lingual diameter likewise permits depression of the pontic to compensate for the shrunken ridge (Fig. 7). The proper depression of the labial surface gives the effect of normal length to the facing. Esthetics not only demands a tooth of harmonious outline but one of normal length as well. To place anterior pontics in the exact location of the missing teeth produced an elongated appearance owing to the shrinkage of the labial aspect of the ridge (Fig. 8).

### Two Methods of Contacting Pontic With Ridge

Generally speaking there are two methods of contacting the pontic with the ridge; the so-called saddle tip and the egg-shape or conical tip. The use of either depends on location and ridge condition (Fig. 9).

*The Saddle Tip*—The saddle tip is indicated in those cases in which it may be kept more hygienic and more in harmony with esthetics than the conical type. The typical ridge for a saddle case is one of the upper arch, completely healed, smooth and rounded.

At the labial or buccal aspect of

the ridge the tip contacts in such a way that it simulates the gingival margin of the natural tooth. As the surface progresses toward the lingual, it must become definitely convex, mesio-distally; lingually, it should assume a decidedly spherical form. The term "saddle tip" is somewhat misleading. There is a saddle-like adaptation of the ridge from a bucco-lingual or labio-lingual aspect, but the mesio-distal convexity permits natural self-cleansing. Interdental spaces should be accentuated to reduce tissue contacts as much as esthetics will permit. Firmly attached tissue will readily adapt itself to saddles properly designed and glazed, and will often form a gum-fold simulating the free gingiva.

Embrasures, particularly toward the lingual, must be opened wide and the contacting surfaces designed to permit the natural stimulating movements of the tissue in mastication to eliminate food particles and other débris through the interproximal spaces. This tissue movement tends to maintain a normal stratum corneum beneath the contacting porcelain (Fig. 10).

Improperly designed saddles, with their broad, flat, angular, often improperly glazed surfaces result in lack of hygiene, stagnation, and inflammation of underlying tissue, and must be condemned as one of the outstanding misconceptions of the fundamentals of bridgework. Observation readily shows that this thoughtless deprivation of natural stimulation results in atrophy of the ridge, further complicating an already unsatisfactory condition.

*Conical Tip*—The conical tip should always be given preference over the saddle type wherever consistent with the esthetic consideration. When properly designed and reduced in size, it lends itself more readily to cleanliness. This is particularly true of lower posterior cases.

The restoration is best when made after the ridge has completely healed. The successful application of the immediate restoration principle is limited. Single restorations of the incisors, particularly of the upper laterals, are ordinarily a success.

A pontic designed for immediate restorations or for a partly healed



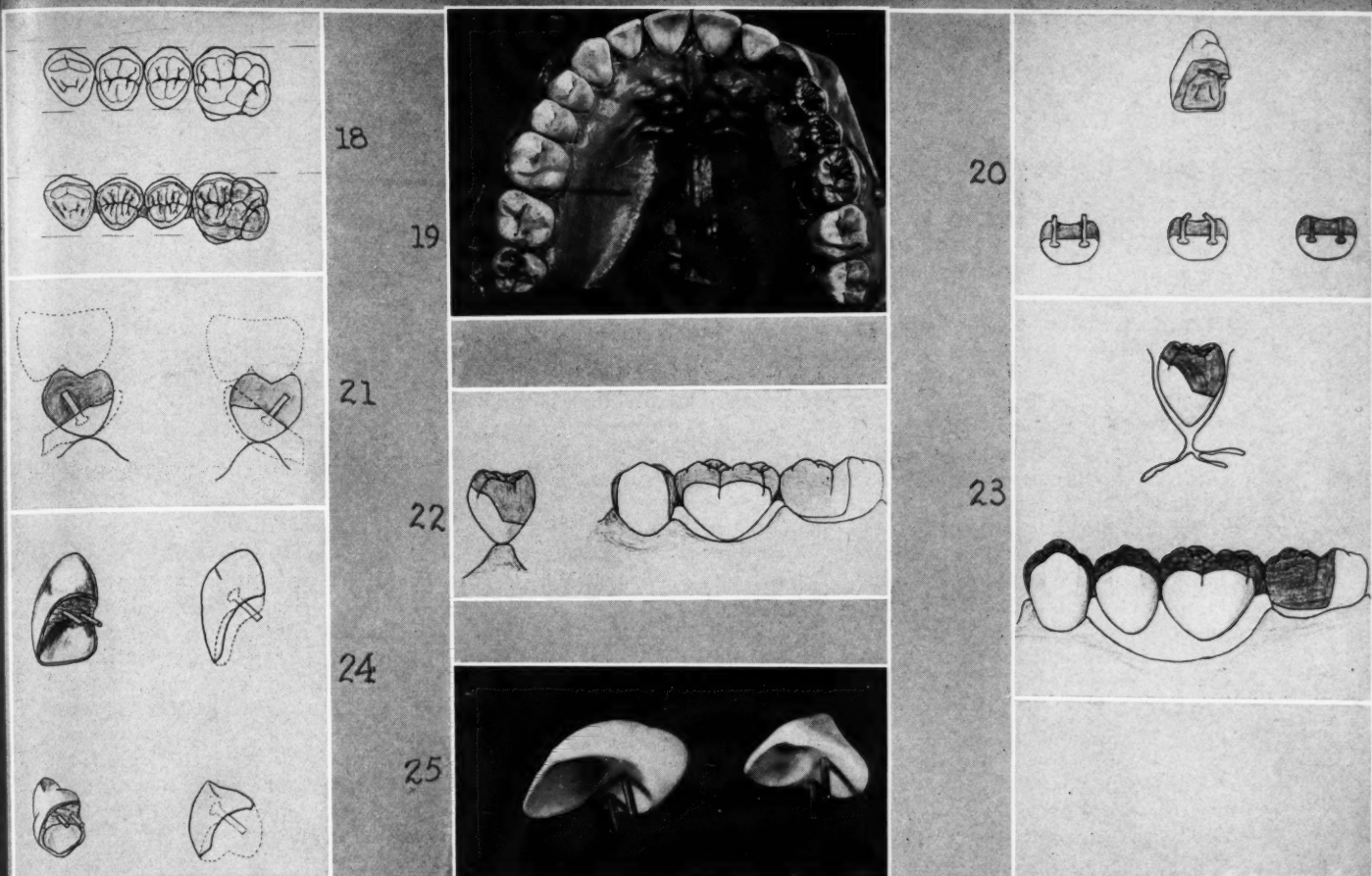


Fig. 18—Notice reduced dimensions of pontics and accentuated occlusal carvings.

Fig. 19—Correct occlusal pontic form contrasted with normal teeth of opposite side. Note formation of blade-like cutting surfaces by modified occlusal anatomy.

Fig. 20—Method of clinching anterior facing to backing at time of cementation.

Fig. 21—Cross sections of lower posterior short bite pontic constructed by remodeling a long-pin facing.

Fig. 22—Typical lower first molar restoration illustrating correct pontic form with heavy occlusal reinforcement.

Fig. 23—A typical lower case of excessive resorption with pontic form permitting the contact of cheek and tongue beneath the tips to facilitate hygiene.

Fig. 24—Suggested design of long-pin facings to be manufactured with hollow-ground principle and integral tips.

Fig. 25—Photograph of models of suggested design.

case requires a conical tip. Such a tip should be blunt and smoothly contoured with its lingual portion narrowed mesio-distally. The fallacy of using long, root-shaped tips which pass far into the alveoli has been proved. This procedure causes excessive bone resorption with inevitably unsatisfactory results (Fig. 11). The present trend is to make the conical tip exceedingly short. These shorter tips permit a degree of tissue movement which tends to form a normal epithelial lining beneath the porcelain (Fig. 12). The ideal length, then, is such that when healed the mucosa immediately beneath the tip will be lined with normal epithelium.

All that has been said regarding

reduced pontic dimensions for the saddle tip applies also to the conical tip. It is a mistake to fill the alveolar opening completely with a tip of the same diameter as the extracted tooth. The inevitable resorption of the process with the shrinking of the ridge will cause food pockets in this region as well as an unsightly appearance owing to the unnatural relation of the labial or buccal surfaces to the gums (Fig. 13).

#### Reliability of Long-Pin Facings

Time has proved the reliability of pontics constructed with long-pin facings properly reinforced with hard gold backings. Bridgework

must be constructed with inherent strength to resist the stresses brought to bear on it. This type of pontic is readily adaptable to variations and at the same time possesses factors of maximum strength and esthetics (Fig. 14).

#### Strength of Pontic

Porcelain, except in bulk, has little resistance to fracture. The strength factor of the pontic is represented by the gold, so designed as to prevent stresses being carried to the underlying porcelain. Facings are seldom fractured by external violence. Failure is usually due to stresses of mastication being carried indirectly through an inadequate gold rein-

forcement which is insufficiently rigid to resist bending.

### Hollow-Grinding Principle

By careful application of sound mechanical principles, facings may be backed by hard gold in a manner that will virtually eliminate breakage and objectionable display of gold (Fig. 15). Hollow grinding of the facings which permits a backing with the mechanical advantage of additional bulk of gold in an arched form that greatly increases the protection of the underlying porcelain, also permits the correct labio-lingual or buccal-lingual dimensions.

The incisal or occlusal edge of the hollow-ground facing is also important in the concealment of the reinforcing gold. This gold is so rounded that direct light reflections are thrown downward away from the observer thereby concealing it from view. Incisal or occlusal strength is in no way diminished (Fig. 16).

### Exception to Hollow-Grinding Principle

There is one exception to the use of the hollow-grinding principle: this is the lower anterior; but fortunately, stresses coming as they do, permit us to make these cases with exposed porcelain in order to obtain beautiful results (Fig. 17). The gold backing is carried to the incisal and so rounded away that light reflections are thrown back into the mouth. Incisal edges may be readily stained to simulate the natural teeth.

### Determination of Degree of Stress

The degree of stress thrown upon the abutments is determined by the bucco-lingual diameter of pontics and the nature of the occlusal carvings. The length of the span should govern to a great extent the diameter of the pontics (Fig. 18). Reducing and depressing the pontics tend to eliminate the natural curvature of the arch, thus minimizing torsional stress. By defining the occlusal markings, more efficient cutting and tearing surfaces are provided. Accentuated triangular ridges and distinct buccal and lingual grooves will certainly give a maximum of function from the force applied and

lessen the danger of traumatic injury to the periodontal structures (Fig. 19).

### Strengthening Facing Attachment to Backing

In anterior restorations when the labio-lingual proportions are correct the pins of the facing are long enough to protrude through the backing, so that on cementation these pins are bent over toward each other with small pliers and ground off to leave a riveting effect which enforces the attachment of the facing to the backing (Fig. 20).

### Long-Pin Facings for Short Bites

Short bite cases with the attending difficulty of obtaining sufficient bulk of metal with the porcelain tip are best handled by the use of long-pin facings laid against the ridge in such a manner that the pins are directed toward the center of the cusps of the gold backing (Fig. 21). Facings of sufficient porcelain bulk must be selected to permit their being ground and contoured to the correct shape and adaptation to the tissue. It is unnecessary to build additional porcelain on these facings for a tip as the facing itself is ground to contact.

### Direction of Pins

The position of opposing occlusion will determine toward which cusp the pins may be directed. In some cases it will be desirable to place the pins in the lingual cusp, whereas in others, to obtain bulk of gold they should be directed toward the buccal.

### Reinforcement of Cusps

The buccal cusps of lower pontics should always be heavily reinforced. Little or nothing is lost from the esthetic standpoint whereas a fracture means the ruination of the bridge (Fig. 22).

### High-Fusing Porcelain Used

Only porcelains in the high-fusing group should be used. Tips are added of the same fusing point as the body of the facing and later may be overlaid with a layer of porcelain of slightly lower fusing point which will be highly glazed. The final addition of porcelain and glazing is accom-

plished after the gold reinforcement has been completed. By so doing the desired adaptation of the tip is more readily obtained.

Low-fusing glazes and porcelains have resulted in many needless failures. Such glazed surfaces lack the self-cleansing property and tissue toleration of the high-fusing porcelain, and almost invariably etch after a time. The success of bridge-work depends on this factor; therefore, a bridge made of low-fusing porcelain may become an irremediable failure.

### Esthetics

Esthetics may often be improved with the skillful use of stains and gum-pink porcelain. Pink porcelain should not be used with the idea of artificially restoring gum tissue, but should be used to give the effect of blending the tooth into the gums beneath the shadows of the lips and cheeks. Attempts definitely to restore the gingiva usually result in an artificial appearance. The effect of receded gums on a darkened root will be far less noticeable.

In cases of excessive resorption, particularly of the lower, it is well to keep the porcelain tips well above the crest of the ridge. To permit the cheek and tongue to touch beneath these tips facilitates hygiene (Fig. 23).

### Conclusion

Many attempts have been made to design facings applicable to advanced bridgework. Invariably these have been limited in their usefulness. As previously stated, we believe that the long-pin facing is the best mechanical principle yet devised (Fig. 24). Facings manufactured with integral tips, hollow-ground, and scientifically designed, properly placed pins being used, would fulfill a long-felt need in advanced bridgework (Fig. 25).

The ideal of a dental bridge should be one that harmoniously assumes an integral relationship to the remaining structures of the oral cavity, free from annoyance to the patient, and requiring no unusual hygienic care. This, we believe, can be accomplished by scientific and skillful designing of the pontic.

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Fig. 1—Note fracture at neck of condyle and angle of jaw. Fig. 2—Fixation through a plaster bandage applied after the Barton bandage fashion. Fig. 3—Note malalignment and overlapping of fractured parts.

## Fractures of Edentulous Jaws

JOSEPH E. SCHAEFER, M.D., D.D.S., Chicago

FRACTURES of edentulous jaws present an entirely different problem from fractures of the mandible or maxilla when the teeth are present. The restoration of occlusion by the various methods of wiring teeth together brings about reduction, alignment, and immobilization of the fractured parts.<sup>1</sup> When the teeth are missing, it is necessary to resort to other methods of reduction and immobilization.

The main object in handling edentulous fractures is to get a union. Absolute alignment of the fractured parts is not so important. Fair approximation of the fragments with proper immobilization is all that is necessary. In edentulous fractures there is not the problem of the restoration of occlusion of the teeth for good function. Loss of occlusion in fractured jaws when the teeth are present leads to deformity and loss of function. In edentulous jaws, however, if a good union is obtained, it is unimportant if the fragments are not perfectly aligned. The function of occlusion can be restored by the insertion of artificial dentures.

### Report of Cases

**CASE 1**—A man, aged 55, who was edentulous but wore artificial dentures, was struck and knocked down by an automobile thus sustaining two fractures of the mandible (Fig. 1).

**Examination**—One fracture occurred at the neck of the condyle and the second at the angle of the lower jaw. It will be noted that there is some displacement with overlapping of the fragments at both sites of fracture (Fig. 1). The overlapping fragments were in a favorable position; therefore, no effort was made to disturb these fragments, because good contact of bone is essential to union.

**Problem**—The problem here was one of simple fixation; any irregularity of the fracture line would correct itself by repair and subsequent function. As stated in a previous article,<sup>1</sup> fractures of the neck of the condyle correct themselves under proper immobilization. They do not lead to ankylosis in my experience. It is not always necessary to attempt to get perfect alignment of fractures of the jaw. Good contact of the fracture ends, with restoration of the occlusion when teeth are present, and good immobilization are the requisites of proper healing of the fractured bones.

**Treatment**—The treatment of this case consisted in inserting the dentures in the patient's mouth and immobilizing the mandible in relation to the maxilla

by a plaster Barton bandage (Fig. 2). Immobilization of the mandible to the vertex of the skull through a plaster bandage gives ample fixation. When union has occurred, properly fitting dentures are then constructed, and restoration of occlusion can be accomplished.

**CASE 2**—A man, aged 50, sustained a fracture of the mandible with considerable displacement and overlapping of the fragments (Fig. 3).

**Treatment**—Surgical intervention was considered justifiable. Circumferential wiring was done. This is a less dangerous procedure than direct wiring, because no injury is done to the bone. Direct wiring often leads to bone infection and failure of union.

**Technique for Circumferential Wiring**—(Figs. 4 and 5) 1. An incision is made along the lower border of the mandible at the site of the fracture.

2. The fractured bone is exposed but the periosteum is not disturbed.

3. Two silver wires are then passed circumferentially about the fractured ends of the bone embracing them, coming through the buccal sulcus and hugging the bone closely on both the lingual and buccal aspects.

4. The denture is then placed in the mouth, or, if no denture is available, a lead plate bent to conform to the alveolar crest may be used.

5. The two wires are then twisted together, individually, embracing the denture.

6. While doing this the fragments are manipulated so that they become seated and aligned to conform with the shape of the denture.

7. The wires are then twisted taut.

8. A plaster Barton bandage will as-

<sup>1</sup>Schaefer, J. E.: Treatment of Fractures of the Mandible and Maxilla, DENTAL DIGEST, 41:265 (August) 1935.



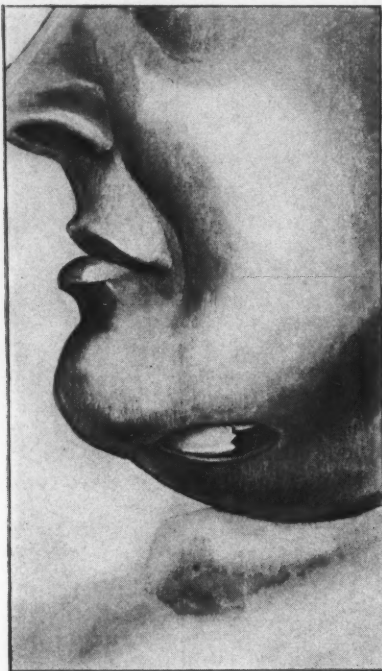


Fig. 4A

Fig. 4—A, Incision made at lower border of mandible at site of fracture with bone exposed.



Fig. 4B

B, Trocar with cannula passed through incision at lower border of jaw along buccal surface, penetrating into mouth at buccal sulcus.

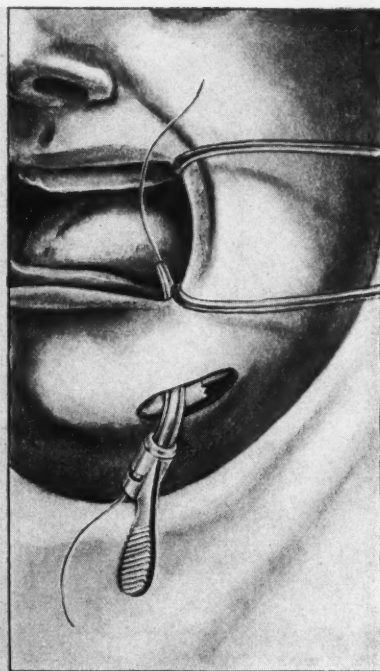


Fig. 4C

C, Trocar has been withdrawn leaving cannula in place. Silver wire is now passed through cannula from the mouth side; cannula is withdrawn from wire, leaving the wire in place extending from buccal sulcus along buccal surface of mandible out through the incision at lower border of mandible.

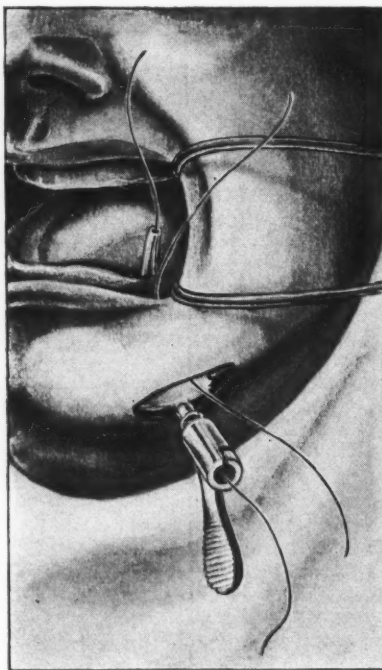


Fig. 5A

Fig. 5—A, The trocar with cannula is passed a second time through the incision wound at the lower border of the mandible. This time it passes to the lingual surface of the mandible, penetrating the floor of the mouth close to the bone. Trocar withdrawn and a second wire passed through the cannula; cannula withdrawn, leaving second wire in place on lingual surface of mandible.

B, The two wires are now hooked together below the mandible.

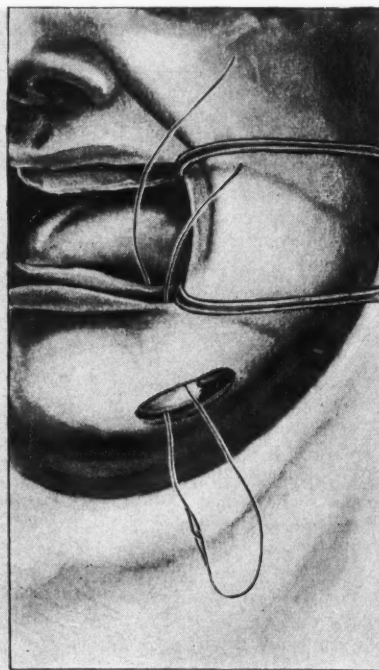


Fig. 5B

The lingual wire is now withdrawn, carrying the buccal wire with it. The lingual wire is then unhooked from the buccal wire.

C, Silver wire is now placed circumferentially about the fractured mandible distal to the fracture line with the free ends of the wire in the mouth. A second wire is now passed in the same manner mesially to the fracture line. Both wires can now be twisted together embracing the lower denture.



Fig. 5C

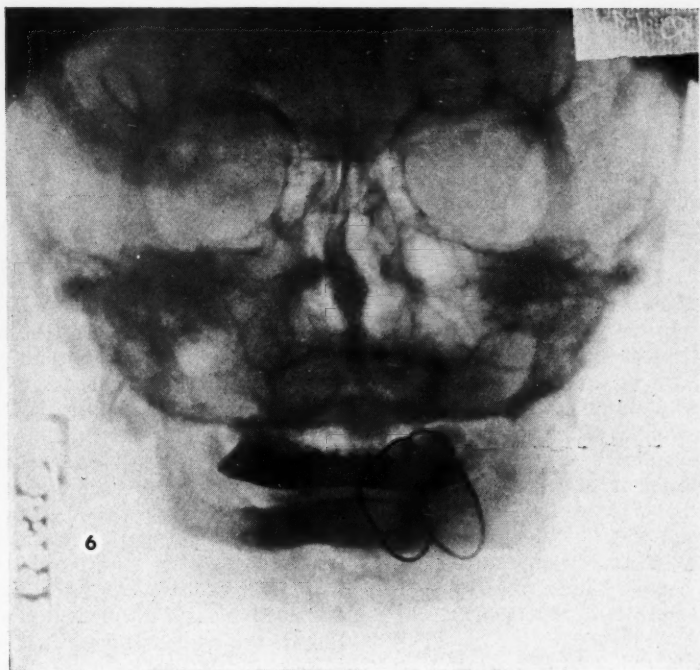


Fig. 6—Note good alinement of fractured parts.

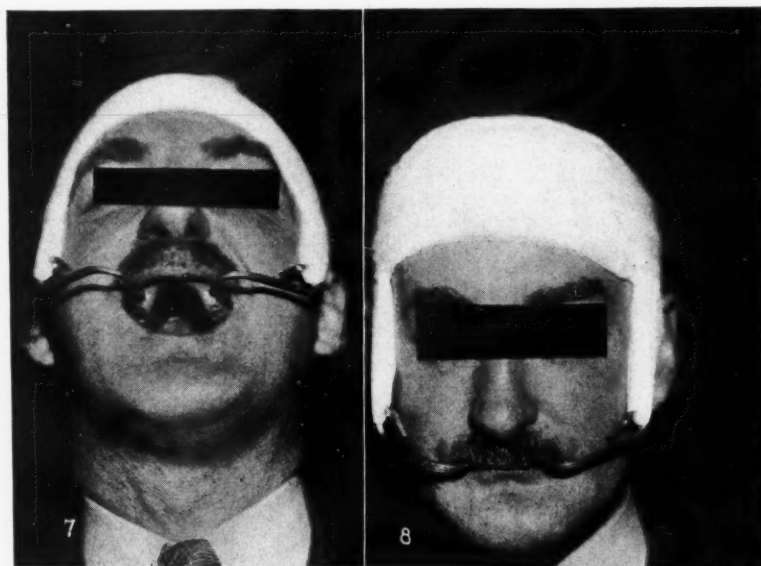


Fig. 7—Kingsley splint with occlusal indentation of lower teeth.

Fig. 8—Bars of Kingsley splint adjusted properly at angles of mouth.

sure complete immobilization (Fig. 6).

**CASE 3**—A complete transverse fracture of the maxilla was sustained from a severe blow to the face. The nasal bones and the right malar bone were also fractured.

**Examination**—Roentgenograms are of little value in the diagnosis of a complete transverse fracture of the maxilla. Clinical observations are more positive. In this case when the palatal arch was grasped, it was freely movable with the nasal bones moving with the same manipulative procedure.

**Treatment**—The nasal fracture was reduced intranasally by elevating the broken fragments into their normal position. This is important if an ugly deformity of the nose is to be prevented. We did not feel justified in correcting the fractured malar bone further than that which was accomplished by the reduction of the fractured maxilla.

The maxilla was fixed to the vertex of the skull by means of a Kingsley splint and a starch bandage. The Kingsley splint was constructed by using the patient's upper denture as a pattern (Fig. 7). The indentation on the vulcanite splint of the teeth of the lower denture will be noted. This assured the right occlusal plane.

The bars of the Kingsley splint must be so adjusted that they do not cut the angles of the mouth as they project extra-orally (Fig. 8). The symmetry of the nose and face will be noted in Fig 8.

### Conclusion

Many fractures of edentulous jaws will heal if the patient remains on a liquid diet and there is little or no movement of the mandible. This is true if there is not extreme displacement of the fragments, and there is no compounding of the fracture into the mouth. The injured parts are painful on motion and this alone is often sufficient to prevent the patient from using the jaws freely. By the time the pain disappears sufficiently callus may have been formed to hold the injured parts stable and allow repair to go on uneventfully.

55 East Washington Street.

# Platinum Reinforced Porcelain Restorations

FRED R. FELCHER, D.D.S., Chicago

THIS ARTICLE DEALS with new and radical procedures in dental porcelain restorations, involving the use of reinforcing platinum metals and offering a change in method of preparation of teeth to allow for finish-line preparations with or without partial shoulders, according to esthetic requirements. In the accompanying illustrations it will be noted that teeth are prepared for types of crowns for anteriors and for posteriors, a labial shoulder being used on the anteriors as far as the first bicuspid, and the complete elimination of shoulders on posterior teeth. This method of restoring teeth requires the least amount of tooth removal.

Reinforced crowns are indicated in the following conditions: (1) in cases of destruction in which reinforcement under porcelain prevents directional forces from fracturing the crown; (2) in cases in which the cutting of shoulders would endanger

the pulp, particularly in lower anteriors and in all posteriors, whether for replacements of gold crowns, or when it is difficult to prepare shoulders; (3) in bite-raising cases.

Because of the method used in building these restorations, strong adapters of hard metal are built which are used for reinforced porcelain bridgework of a nature different from and far stronger than any yet devised, and free from the effects of gassing or discoloration.

Of importance also is the union obtained with metal and porcelain, a union that can be separated only by grinding, hammering, or by removal with hydrofluoric acid.

## Explanation of Breakage of Porcelain Jackets

**Enamel Structure**—In studying the dentine and enamel relation as it is found in the human tooth the enamel is found to be protected against attritional forces by the den-

tine which follows the general characteristics of the outline of the tooth. Centrals resemble centrals, bicuspid resemble bicuspid, and so on. There is a veneer-like application of the enamel over the dentine (Fig. 1). The construction of enamel is well known; it is the hardest substance in the human body. If the enamel is undermined, it can be removed simply by cleaving.

**Directional Forces**—Aside from accidents, jacket crowns are broken by directional forces applied through unsupported porcelain during attrition. These forces account for the noticeable half-moon or vertical fractures that are so frequently seen. Despite the wear at the points where attrition impinges, the real force is absorbed by the tooth as a whole; these worn points demonstrate only directional forces applied to the tooth. There is an absorbed force on the tooth which is applied to the enamel and absorbed into the tooth;



Fig. 1—Dentine-enamel relationship.

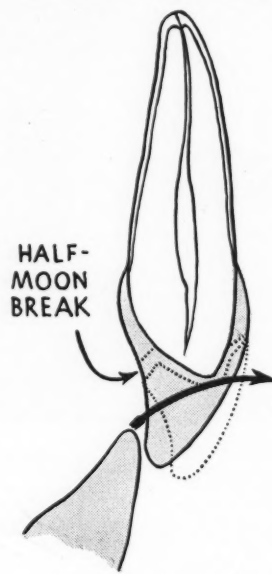


Fig. 2—Directional forces causing "half-moon" break on anterior tooth.



Fig. 3—A finish-line reinforced crown.



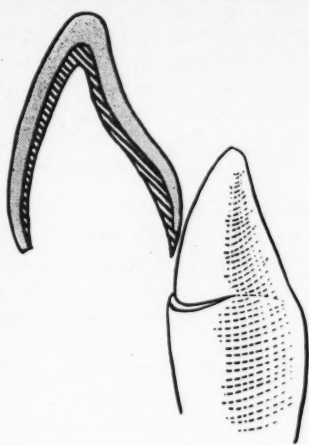


Fig. 4—Finish-line anterior re-inforced crown. Labial shoulder only in tooth structure.

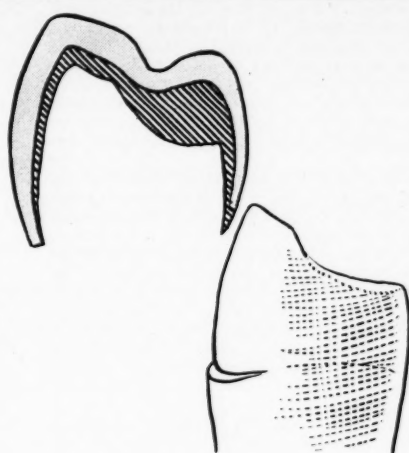


Fig. 5—Finish-line partial shoulder bicuspids. Note metal reinforcement of broken tooth.

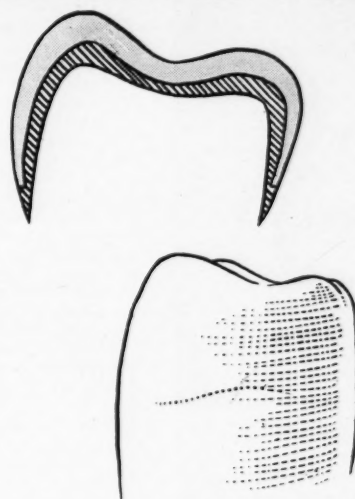
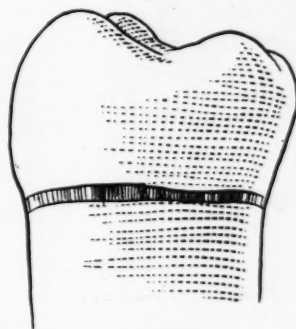
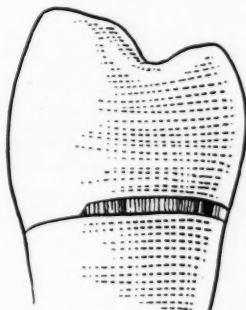
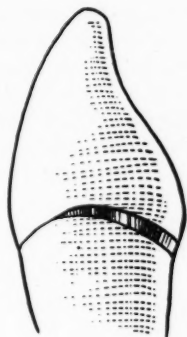


Fig. 6—Complete shoulderless molar; for full mouth reconstruction or in cases of bite-raising.



the force, in turn, is cushioned by the tooth membranes. The support of the enamel by dentine provides a *veneer principle*.

If a piece of fragile material, such as glass, were laid on a perfectly flat surface, pressure applied to the glass would be absorbed at the point where the pressure was applied. It would not be distributed through the glass; this is *absorbed force*. If something is placed under one end of the glass to elevate it and pressure is then applied, the glass will break. This demonstrates a *distributed force*. When a preparation under a jacket crown has a short stump and a long jacket crown is built over this stump, invariably a half-moon fracture is caused by directional forces through the porcelain (Fig. 2).

Another demonstration can be made by holding a pencil near one end and applying pressure at the free end. It will be noticed that the force is distributed to the end of the pencil that is held in the hand and clearly demonstrates the first principle of directional force, such as encountered with a half-moon fracture in porcelain. Suppose that we move the hand closer to the place where the force is applied. Then it will be noticed that there is no longer a distributed force; the hand absorbs the force just as the tooth would.

Vertical fractures of teeth can be explained in the same manner. If a pencil is held in the center, horizontally, and force is applied at each end of the pencil, it will be noted

that a directional force is applied through the pencil laterally. In this type of force the break is straight through the crown. Such a fracture is noticed in connection with cone or peg preparations. This kind of stress accounts for the breakages that occur in all porcelain wing bridges.

#### Consideration of Shoulder in Porcelain Jacket Preparation

For many years the idea has been generally accepted that a shoulder is necessary in any preparation for a jacket crown. The shoulder gives an opportunity for a butt-joint between the porcelain and the preparation. Many dentists believe that the shoulder influences the strength of the jacket crown. Experience has proved that the shoulder affords lit-

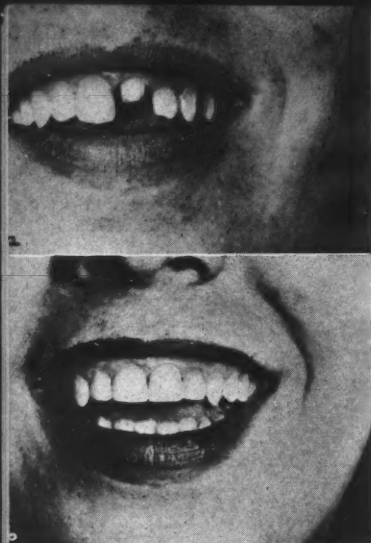


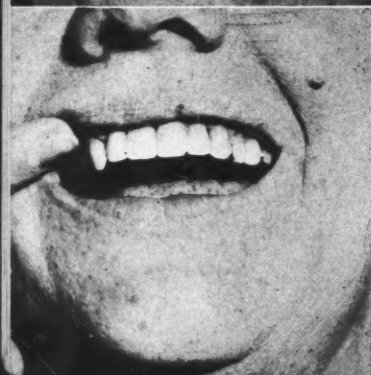
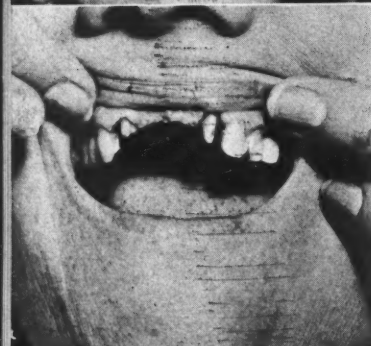
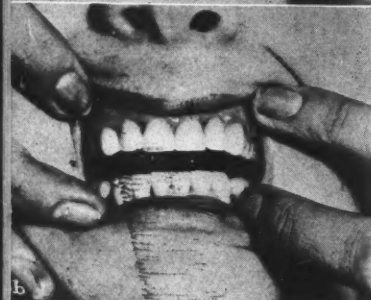
Fig. 7, A and B—(Illustrations and legend submitted by Doctor T. V. Connor of Dallas, Texas.) Badly fractured upper right central, caused by accident in childhood. Upper and lower arches were normal in their occlusion, except that the lower right lateral was in labial version and there was an end-to-end bite with the fractured tooth. Orthodontia in this case would have been complicated, and because a simple jacket could not be used owing to its susceptibility to fracture, reinforcement was necessary.

This porcelain restoration was made possible only through the use of the reinforced iridioplatinum jacket crown, and was unique in that the metal reinforcement was exposed to open occlusion to within about 2 mm. of the incisal, metal being left which is hard for all occlusal stress. A slight adjustment of the labial incisal of the lower lateral allowed sufficient thickness for the occlusion to the metal of the restored crown on the lingual. This method makes it possible to build metal for reinforcing as well as strength, and also allows porcelain to be baked directly to the metal with excellent results.



Fig. 8, A and B—(Illustrations and legend submitted by Doctor T. V. Connor of Dallas, Texas.) Results obtained for a patient with extensive caries involving twenty-four teeth. Twelve porcelain jacket crowns were constructed and the posterior teeth were reconstructed with gold. Two reinforced wing bridges were made; the upper right and lower left laterals were replaced. Fine precision was obtained through the use of low-fusing metal adapters made for the amalgam dies and placed on the teeth for impression for die relationship on the master model. Fourteen porcelain restorations were set without the necessity for contact or occlusal adjustment.

Fig. 9, A and B—(Illustrations and legend submitted by Doctor T. V. Connor of Dallas, Texas.) Patient presented with open face lateral to lateral bridge. Examination of preparatory photograph clearly showed how little tooth structure was available for construction of abutment. The weak abutment was built to a normal preparation with the metal, and construction was completed.



tle if any added strength to the jacket crown. A shoulderless preparation gives a crown as strong as one with a shoulder, provided the porcelain is supported against attritional forces.

I am not advocating the use of a shoulderless preparation wherever an ordinary porcelain jacket crown is to be used. I believe that a problem in fractures has been solved in connection with porcelain restorations which enables dentists to place reinforcements on teeth with a minimum of tooth destruction. Directional forces can thus be compensated for in the reinforcements. The foregoing statement may sound strange but actually embraces the keystone of the new technique, an explanation of which will call for a discussion of the difficulty encountered in trying to unite porcelain with a close bond to any of the metals used heretofore. In this technique

a definite finish-line preparation just below the free margin of the gums is all that is required. This permits a thin line of platinum metal to be placed slightly below the gum margin, thus providing a slight shoulder in the metal for the adaptation of porcelain (Figs. 3, 4, 5, and 6).

### Union of Ceramic Materials and Metals

The lack of union between ceramic materials and metals is recognized; nevertheless, table tops, wash bowls, and kitchenware are seen in which ceramic materials, known as enamels, are baked to certain irons or steels. Here the process consists of especially prepared metals, which are first properly cleaned, ground-coated, and covered with an enamel that has been balanced in coefficient to that of the metal. The metals are hard enough to remain rigid, for if they are allowed to bend the enamel will flake off, and if such a piece of enamel is handled in the fingers, it can be crushed as easily as a piece of egg shell.

Dental porcelains differ from enamels in many respects. They really belong to the glaze family owing to the methods of compounding for dental uses. They have properties that make their use in combination with metals difficult. To begin with there is no balance in coefficient with the metals that dentists have used in the past. Checking or gassing is usually encountered. These difficulties of gassing or checking are by no means the most important reasons why difficulty is encountered in attempting to bake porcelain onto metals. One has only to recall how easily a pure platinum matrix is stripped from a porcelain jacket crown, showing that no chemical or mechanical bond exists. This, then, demonstrates that the most important aspect of this problem of uniting porcelain and metal lies in the adhesion of the porcelain to the metal. Merely to have metal *inside* of the porcelain without a definite union is not only of no advantage but increases the likelihood of cleavage.

An alloy has been developed of the platinum metal group having a balance with ceramic materials

which permits a union between the metal and dental porcelains. A union is provided between metals and porcelain which is so complete that the entire crown of metal and porcelain would have to be crushed in order to fracture the porcelain, or the whole dropped into hydrofluoric acid for removal of the porcelain.

Preparations for teeth in this technique carry the same fundamentals as for the regular porcelain jacket crowns. Sufficient room is allowed for porcelain as in any jacket requirement.

#### Technique for Anterior Tooth

1. Remove any enamel on the incisal at least slightly beyond the dento-enamel junction. Then remove the enamel proximally, cutting a definite taper. Remove sufficient tooth structure, both labially and lingually, as if for a good jacket crown preparation. Be sure that a definite tapering of the tooth structure is present.

2. Stones and discs or strips may be used to round corners. Fit a tight, well-festooned band to conform to the prepared tooth, marking the labial surface with an "X." The cervical of the band should extend to where the finish line will end.

3. Remove the band and fill with impression material. Cut a shoulder where required with a sharp cross cut number 701 bur, finishing with

an end-cut bur or Ivory Bastian root file. Take the tube impression of the prepared tooth, leaving the end of the tube slightly free at the finger contact until perfectly seated before sealing with finger pressure.

4. The wax core method of covering the tooth with a subsequent plaster impression may be used, although in bridge construction I prefer separate metal test teeth for accuracy. These are made as follows:

a. After the die is constructed, a tin foil matrix is made.

b. A paper tube is tightly fitted a little below the shoulder of the die.

c. Low-fusible alloy is poured into the tube, chilled, then trimmed to the die for gum line, contact, and occlusion.

d. A plaster impression with the metal test tube in place is then taken.

e. The bite is taken and the shade determined.

5. In the construction of a reinforced porcelain jacket, a platinum matrix is made first. This in turn is covered with a secondary matrix made of balanced iridioplatinum metals, the gauge depending on the amount of tooth removal, and as in the case of a bridge, the amount of load to which the tooth would be subjected.

6. The finish-line reinforcement, which is the method of building for width or length for the prevention

of breakage, is built by welding with a reinforcing metal at a temperature of approximately 3300°F. The metal has special properties that provide the necessary factors and allow perfect union between metal and basic ceramic materials.

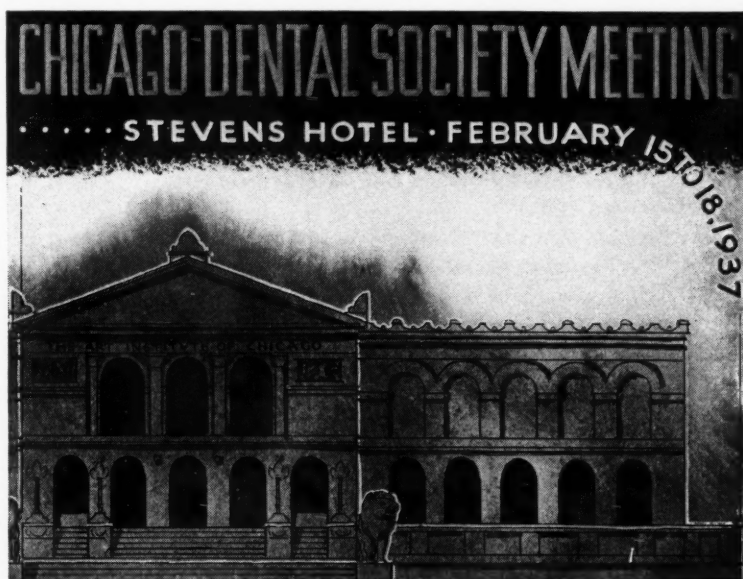
#### Conclusion

It was positively necessary to provide a refractory material that could be used when metals were subjected to high temperature, without undergoing volumetric changes or contamination of such metals.

This is a pioneer field in dentistry and research is constantly being carried on to perfect the technique as well as to adapt it to the widest possible use in the field of dental prosthetics, such as precision attachment type. Some development has been made in the casting of these materials. The metals are balanced to basic ceramic materials which are applied first as a ground coat, and second, for opacity. This is then covered with the dental porcelains.

There are variations of the technique for use in three-quarter inlays and pin inlays, for example, which are used in connection with reinforced porcelain jacket crowns in the construction of bridges.

25 East Washington Street.





# The Editor's Page

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MORE THAN FORTY years ago, in May, 1896 the first exclusive roentgenologic publication appeared in England. It was called the *Archives of Skiagraphy*. This was one year after Roentgen's discovery of the unknown rays. Cases are on record of the medical application of the "x-rays" within the first few weeks after Roentgen's discovery. In Paris the rays had been used in an attempt to diagnose bone disease and in Berlin to watch the formation of callus following a fracture. In the summer of 1897 C. Edmund Kells of New Orleans was making dental roentgenograms and Morton of New York obtained a roentgenogram of the entire adult human body. This entire skeleton picture was made with a total exposure of only thirty minutes.

Since that autumn of 1895 when Roentgen made his discovery dental practice has been revolutionized. The x-ray apparatus is now as essential to modern dental practice as the dental engine. Intelligent dentistry cannot be practiced without it. The history of roentgenology may be divided into three arbitrary epochs. The first might conveniently be called the *phase of armamentarium* in which the interest was chiefly in tubes, types of paraphernalia, and other physical features. The mere possession of equipment and the "taking of pictures" sufficed to constitute a service. Unfortunately there are too many survivals of this epoch in our own day.

The second epoch was one of evaluation in which we began to appreciate that roentgenograms need have qualitative values as well as quantitative ones. The mere arrangement of films with various shadow images recorded in itself did not represent a service. To paraphrase Doctor Clarence Simpson, we might call this epoch *the time of seeing things in the dark*. At that time any dark area whether it was a medullary space, or a loss of density from chemical or mechanical causes was likely to be called ominously "an abscess." During this period, teeth dropped into baskets like heads during the French Revolution.

We are now probably in the third arbitrary stage: the *epoch of appreciation*. We seem to realize the nature of the roentgen rays more clearly. We see the roentgenogram as an aid in diagnosis. On it are recorded differences in density of tissue; it shows mere shadows; it does not show disease *per se*; it is not fool-proof; there is nothing clairvoyant in its nature. Distortions of structures and of facts can easily occur. Insertion of a film, the pressing of a button, the processing of films, the viewing of roentgenograms under a powerful light with a magnifying glass—all these are not the whole of roentgenology. Anyone who attempts to give intelligent service in this field of dentistry must first know in his own mind what constitutes an acceptable roentgenogram. Next he must know normal anatomy, and third he must be able to evaluate pathologic processes. No kind of equipment, no tricks in photography or finesse in the dark room can substitute for a power of observation well developed, for the ability of logical deduction, for the quality of exclusion. In the interpretation of roentgenograms it is necessary to observe, deduct, exclude. We can do none of these without first having an accurate negative, and second, a broad biologic and clinical background to carry to the job of interpretation.

To interpret a roentgenogram is to read into a piece of film the history of a person, his biologic nature, his patterns of disease. We see before us a shadow-graph of living tissue. We cannot read wisely nor accurately unless we know the facts of tissue in health and in disease. To present the roentgenologic service as a form of photography at so much an exposure does not represent a professional service. The selling of photographs is business. A complete and intelligent interpretation and evaluation of roentgenograms is a professional service. In presenting this phase of dental care, dentists should emphasize the interpretive aspects of roentgenographic examination and let the selling of "dental photographs" be the earmark of advertising dentists.

# Elective Localization of Bacteria in Foci of Infection

(Continued from November, 1936 issue)

OSCAR KARPf, D.D.S., New York

**ARTHRITIS (CONTINUED)**—Billings<sup>20</sup> maintains that streptococci obtained in pure cultures from many patients with arthritis, when inoculated into animals produced acute arthritis, either single or multiple, and in many animals, an arthritis deformans. Furthermore, the streptococcus has been obtained in cultures from the tissues of the dead animal. Cultures from the tonsils of patients who had no systemic infections contained streptococci that were virtually the same as those of patients who had systemic diseases.

## Summary of Rosenow's Conclusions

It is unnecessary to review all the work of Rosenow on elective localization, but a summary of his paper, entitled *FOCAL INFECTION AND ELECTIVE LOCALIZATION*, read before the German Society for Internal Medicine in Wiesbaden in 1930 indicates briefly the basis of his conclusions.

Rosenow<sup>21</sup> proves the importance of focal infection as a cause of disease by the following evidence:

1. Investigations and diagnoses of foci in patients with various diseases.
2. Clinical observations of the effect of such foci as contained pathogenic micro-organisms and of the use of vaccines prepared from strains having elective localization.
3. Determination of the property of elective localization in animal experimentation by using bacteria isolated from foci.
4. Experimentation with serologic reactions of strains obtained from the foci of patients and the organs of the animal used in experiment.

<sup>20</sup>Billings, Frank: Chronic Focal Infections and Their Etiologic Relations to Arthritis and Nephritis, Arch. Int. Med. 9:484-498, 1912.

<sup>21</sup>Rosenow, E. C.: Die Herdinfektion auf der 42. Tagung der Deutschen Gesellschaft f. Inn. Med. Paradenium, 2:121-35, 1930.

5. Microscopic demonstrations of micro-organisms in the tissues of the foci and in the diseased organs.

The percentage of occurrence of foci of infection in various diseases was high. These foci were present in the tonsils, teeth, prostate, and cervix uteri. Streptococci cultures were prepared from diseased tonsils as well as from tonsils which appeared normal, but which after removal were found to be enlarged and abscessed; also from broken root-ends of teeth, left in jaws after extractions. Animals inoculated with human cultures (intracerebrally, in brain disease; otherwise, intravenously) showed symptoms corresponding to the disease from which they were taken. A specific micro-organism, most frequently *Streptococcus viridans*, was regularly obtained from the animal in pure culture; occasionally only mixed micro-organisms were found. The vaccines prepared for the treatment of patients were from streptococci: in some cases from heterologic streptococci which gave the same changes in animal experimentation as in the patient: whereas in other cases, such as in furunculosis, the vaccines were prepared from freshly isolated micro-organisms which were not passed through an animal.

The first evidence that there is a relation between a chronic focus of infection and systemic disease was seen in the occurrence of the specific disease in the animal infected with micro-organisms from a focus. This gave rise to Rosenow's studies of elective localization of bacteria in animals. Subacute infectious endocarditis is the most classic example of the tendency to localization of bacteria and to elective harm to an organ. In this disease *Streptococcus viridans* can be proved to be in the blood stream almost every day or

every second day for several weeks.

*Elective localization means the tendency of micro-organisms, when cultured from different sources of infection or from the blood stream, to produce diseases of the same organs in animal experimentation as those from which they were isolated in patients.* Animal experimentation showed that micro-organisms of a low virulence localized in regions of poor vascularity, such as heart valves, joints, and tendons; whereas those of high virulence produced iritis, myositis, peptic ulcer and nephritis; and those of an extremely high virulence produced lung infections and death from sepsis.

The streams of streptococci cultured from the blood of patients with subacute endocarditis showed a specific affinity for heart valves, producing at first hemorrhages, then extensive proliferations. In such cases there was only a slight tendency for localization in other organs. The characteristic elective abilities of the various strains disappeared after the micro-organisms were cultured on artificial mediums, especially, under aerobic conditions.

To prove elective localization, the following precautions are necessary: (1) the use of mediums that secure a diminished oxygen tension; (2) early injection with mixed cultures, when necessary; and (3) careful examination of all animals, even those that appear healthy, which are used in experiments.

Negative results were obtained in the examination of patients with diabetes, pernicious anemia, leukemias, hematuria, and catarrhal and epidemic icterus.

The serologic experimentations were not sufficient evidence to prove an etiologic relationship. Hyperimmune serums were prepared from the isolated strains and were used

to differentiate between different strains and to treat patients. Isolated strains from specific individual groups became agglutinated. Experimentation on the absorption of agglutinin showed that the reactions were strongly specific.

### Supporters of Rosenow's Theory in Germany and America

Freund,<sup>22</sup> a German investigator, believes in the variability of the streptococcus group; it is possible to change hemolytic streptococci to *S. viridans*, and finally to change them to pneumococci. This has also been proved by Morgenroth, Schnitzer, Kaczynsky and Pulvermacher.

Adloff<sup>23</sup> asserts that oral sepsis is a disease whose port of entry is the mouth, especially in the case of tonsils, pyorrhea, and root-end involvements. The root-end involvements may be due to caries or apical infections at the time of root canal therapy.

During this therapy, some bacteria may be left in the canal and they may pass through the apical foramen and form a granuloma. From this point, bacteria, especially streptococci, are able to get to various organs by means of the blood and lymph stream resulting possibly in a number of systemic diseases. He believes in the transmutability of the streptococcus group. He also supports the belief that streptococci from a dental focus are not spread haphazardly all over the body and in any organ, but that they possess an affinity for localization in a specific organ and possess the ability to carry this with them when injected into an animal.

Precht, following Rosenow's methods, injected cultures of streptococci obtained from infected teeth of patients suffering from nephritis. He obtained changes in the kidneys varying from hyperemic swellings to large hemorrhagic infarcts. With cultures obtained from periapical granulomas of patients suffering from

arthritis, Precht produced chronic arthritis. Although he admits that his experiments are not complete, he maintains that the many experiments which he did, all showed elective localization.

Rickert, Lyons, and Hadley<sup>25</sup> assert that *Streptococcus salivarius*, *S. mitis*, and *S. faecalis* from infected root canals have the tendency to elective localizations. They believe that there is a slight difference among these organisms so far as the power of elective localization is concerned.

R. L. Haden<sup>26</sup> strongly supports Rosenow's theory of elective localization. He experimented on the eye, because this organ permits ready examination for infection and because there is clinical evidence that there is a close relation between oral sepsis and ocular disease.

Billings<sup>27</sup> concludes that streptococci obtained from foci of infection show in many instances a pathologic specificity for certain tissues when injected into rabbits or other animals.

### Criticisms of Rosenow's Theory

The chief criticism of Rosenow's theory is that Rosenow's doses in injections are too great. This is true; with small doses no results or slight manifestations are observed. Some opponents assert that Rosenow can produce elective localization only in young rabbits, whereas the same experiments show negative results in other animals. From Rosenow's written reports this does not seem to be true, inasmuch as Rosenow worked also with guinea-pigs, dogs, and monkeys, and obtained positive results.

Kranz<sup>28</sup> concludes that most experiments on elective localization performed by German investigators have given negative results. Never has such a multitude of organ localization been found as indicated by Rosenow. There is no evidence free from objection of the existence of elective localization of bacteria from foci in the mouth. The bacteriologic experiences prove the opposite. It has however, been proved through extensive and general clinical evidence that general systemic diseases may occur as a result of infective processes in the mouth and teeth.

Schottmueller<sup>29</sup> does not believe that infections, such as pulpitis, granuloma, apical or periodontal abscesses have the importance of septic foci in chronic diseases. He did not find in any of his work bacteria in the blood coming from a dental focal infection. He says that a metastasis in any part of the body from a dental infection is rare. He criticizes Rosenow's work, especially, the theory of elective localization. He asks how many people have local infections without having any consequent diseases. *Streptococcus viridans* in the mouth is present as *B. coli* in the intestines; therefore the proof of foci of infection in teeth and tonsils is of no value. It is not extraordinary to find microorganisms and pathologic-anatomic changes in the organs of a rabbit a few days after the injection of streptococci cultures. According to Schottmueller's studies, all the diseases mentioned by Rosenow are not produced by a streptococcus infection.

Swift and Kinsella<sup>30</sup> of the Rockefeller Institute in an effort to duplicate Rosenow's results on acute rheumatism, took great pains to prevent technical errors, but obtained only 8.3 per cent of positive blood cultures

<sup>22</sup>Freund, R.: Die fluktuierende Streptokokken infectionen, Ztscher f. klin. Med. 108:294, 1928.

<sup>23</sup>Adloff: Oral Sepsis, Deutsche Med. Wchn. schr. 53:1217, 1925.

<sup>24</sup>Precht, E.: Fokale Infection, Deutsche Med. Wchnschr. 53:1131, 1927; 55:1035, 1929.

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<sup>26</sup>Hayden, R. L.: Effective Localization in the Eye of Bacteria from Infected Teeth, Arch. Int. Med. 32:829-849, 1923.

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<sup>28</sup>Kranz, Peter: Der Jostige Stand der Lehr von der Fokalen Infection, Fortscher. d. Zhlkunde 6:295-309, 1930.

<sup>29</sup>Schottmueller, H.: Weber den angeblichen Zusammenhang Zwischen Infektionen der Zahne und Allgemeiner Krankheiten, Deutsche Med. Wchnschr. 48:181-182, 1922. Die Bedeutung der Fokalen Infektion vom Standpunkt der Innere Medizin, Munchen Med. Wchnschr. 36:1527-1531, 1927, Criticism, Centralbl. f. inn. Med. 51:481, 1930.

<sup>30</sup>Swift, H. F. and Kinsella, R. A.: Bacteriologic Studies in Acute Rheumatic Fever, Arch Int. Med. 19:381-396, 1917.



and no positive cultures from the joint effusions in a series of fifty-eight patients.

The work of Bull<sup>31</sup> throws considerable doubt on the importance of the theory that certain bacteria have a marked selective affinity for certain organs.

Holman<sup>32</sup> insists that Rosenow's theory has little experimental basis. He is convinced that Rosenow's work is scientifically unsound and that the interpretations are at variance with the experimental results. *The most important fact to be noted in almost all Rosenow's work is the absence of strict adherence to one point of interest.*

The localization of bacteria, such as streptococci, depends on the following factors: (1) The inherent property in the micro-organisms which is independent of, or which is demonstrable despite alterations in technique or varying susceptibilities owing to different species of animals; (2) the effects of diet; (3) previous or concurrent spontaneous infection; and (4) age and a variety of environmental conditions.

Each of these factors must be controlled independently and it is a difficult undertaking. Streptococci may cause certain lesions throughout the animal body, but it is a 50 per cent chance whether any particular localization occurs from a specific or non-specific strain. Organisms grow in a certain organ because that organ is best suited for their growth. The specificity of the bacteria involved has not been proved, and the evidence favoring the theory of elective localization is open to misinterpretation and limited in its practical application to such an extent that it cannot be considered as a help in the solution of the problem. What Rosenow and his followers particularly showed, however, is that streptococci do localize in various organs and tissues and can produce lesions at least sufficiently suggestive of those found in man, so that their potential danger in infected foci cannot be neglected.

In his critical review of focal infection, Howman<sup>33</sup> comes to the following conclusions:

1. Focal infection has changed, with increased evidence, from a theory to a principle of infection.

2. Focal infection is a principle of infection of great importance in numerous diseased conditions in man.

3. When a focus of infection is discovered and is considered responsible for a diseased condition elsewhere, it requires the highest type of diagnostic ability to prove that this is true. The cure of a patient after the removal or treatment of a suspected focus is generally considered the most convincing evidence that the focus was the source of infection. However, such an outcome may be due to a general tonic stimulus resulting from the removal of one cause of a lowered systemic resistance. Failure to effect a cure by these means may indicate that the focus is not the cause or that the secondary focus is well established and the harm done is irreparable.

#### Extraction of Pulpless Teeth

The phase of the focal infection movement which has occasioned the most misunderstanding and which has been the subject of endless controversy is the problem of the pulpless tooth. The main contention concerns the possibility of the sterilization of the pulpless tooth. One group of workers believe that it is impossible to sterilize the pulp canal and dentine. Despite treatment and filling, periapical infection may occur, or the tooth may still contain a number of bacteria which continually pass into the system and give rise to focal infection. The only safe procedure, therefore, is extraction. Rosenow<sup>21</sup> is one of the strongest advocates of this group.

His views are:

A focus of infection, wherever found, should be regarded as a test tube with permeable walls embedded in the tissues, where channels of absorption of bacteria and their products are afforded. Every possible effort should be made to eliminate the infection in foci by nonsurgical

means. If need be the structure containing the foci should be removed, if it is situated in tissues that can readily be spared, such as tonsils and teeth.

Practically all pulpless teeth in persons with various chronic diseases have been shown to be infected, irrespective of whether roentgenographically they reveal the presence of a pathologic condition. Usually the streptococci isolated from these teeth when injected into animals reproduced the disease that the patient was suffering from at the time. This has been found true no matter what method the dentist has employed in the removal of the pulp and in filling the root canal. Therefore the devitalization of teeth and the filling of root canals as practiced in the past, at least in America, should cease. It is to be hoped that efficient methods may be found that will not only sterilize pulpless teeth and periapical tissues that have become infected, but will also prevent subsequent infection especially of the periapical tissues. The fulfillment of the latter requirement seems almost impossible and until this has been accomplished it would seem wiser to remove teeth that have become infected or require pulp removal than to retain them at the risk of having them become the source of insidious infection later.

Rosenow's stand in this connection has been severely attacked both in America and abroad. Schottmueller made at least ten thousand blood examinations and reports that never in a single instance found the focus to be of dental origin. He urges the combating of Rosenow's teachings by the radical treatment of pulpless teeth and tonsils.

Bieling<sup>34</sup> maintains that Rosenow's interpretation of oral sepsis is unfortunate. Rosenow insists that many diseases were cured after extraction of teeth and that this proves that oral sepsis has an etiologic relation with general systemic diseases. It must be said that modifications are so frequently and so generally diffused that it is impossible to see in them any proof of an etiologic relationship.

<sup>31</sup>Bull, C. G.: Pathologic Effects of Streptococci from Cases of Poliomyelitis and Other Sources, J. Exper. Med. 25:557, 1917.  
<sup>32</sup>Holman, W. L.: Bacteriology of Focal Infection, Dominion D. J. 40:33, 1928.

<sup>33</sup>Holman, W. L.: Focal Infection and Elective Localization, Arch. Path. Lab. Med. 5:68-136, 1928.

<sup>34</sup>Bieling: Criticism, Centralbl. f. Inn. Med. 51:481, 1930.

Walkhoff<sup>35</sup> criticizes Rosenow's radical stand for extraction of all pulpless teeth to remove foci of infection. Dental foci of infection should be fought and removed; however, the road of removal should be a conservative one, even if it is a difficult one. Only in special cases and on special request on the responsibility of a competent diagnostician should the removal of such important organs as the teeth be considered. Even after the extraction of such teeth, it will often be noted that the disease is not eradicated. He also believes that sterile root canal therapy can be performed. In every day practice more inflamed pulps are removed and treated than gangrenous pulps, and they can all be treated with good results. Since Rosenow demands the removal of all pulpless teeth, his demand is not only groundless but also unethical from a professional standpoint. Furthermore, Rosenow has never performed accurate experiments on pulp canal therapy under the rules of modern methods of asepsis. Unless he or some other investigator proves that modern aseptic pulp canal therapy is a failure in the majority of cases, he is not justified in radically demanding extraction of all pulpless teeth. According to the present observations the dentist has no reason to abandon pulp canal therapy of all pulpless teeth as advocated by Rosenow.<sup>21</sup>

The Vienna school consisting of Gottlieb, Orban and Stein,<sup>36</sup> performed a large number of root canal treatments on dogs and monkeys and examined the periapical tissues several months later. They concluded that there was a possibility of obtaining satisfactory results.

Rickert and Hadley<sup>37</sup> maintain that when certain fundamentals and ideals can be approximated with suitable and adequate methods, the degree of success in root canal ther-

apy ranks well with the successes of other branches of surgery.

In a review of cases treated by third and fourth year students at the University of Illinois for about ten years, Blavney<sup>38</sup> found a 73 per cent success in cases of chronic root-end infections and 75 per cent success in removal of vital pulps. He reports that the fact that a tooth has lost its pulp or in some instances has degenerative processes around the root-end does not necessarily indicate the extraction of that tooth. He also believes that the science of histopathology and bacteriology as well as clinical evidence support the statement that many teeth have remained in satisfactory condition for many years after treatment.

Despite progress in the treatment of pulpless teeth and a more thorough understanding of their relative importance as foci of infection, it is impossible to establish a routine practice in respect to the removal or treatment of pulpless teeth. Every case should be studied clinically, bacteriologically and roentgenographically. In cases of definite general symptoms, in which other sources of infection have been eliminated, extraction may be indicated.

### Conclusions

A comprehensive survey of the enormous literature on the subject reveals the following ideas continuously recurring:

1. The existence of oral and other focal infection is a well established fact.
2. The exact nature of the effect which oral foci extend on the body in each case cannot always be readily determined.
3. Dental foci play an important part in infectious diseases but not all pulpless teeth are infected.
4. Elective localization as a hypothesis to explain the occurrence and incidence of focal infection as found in man is not sufficient.
5. The acceptance or rejection of

Rosenow's theory can exert little or no influence on the general concept of focal infection.

6. The safest position for the dentist to assume with respect to extraction of pulpless teeth is that of reasonable conservatism. It is safer to act only on clear indications than to indulge in wholesale extraction of teeth.

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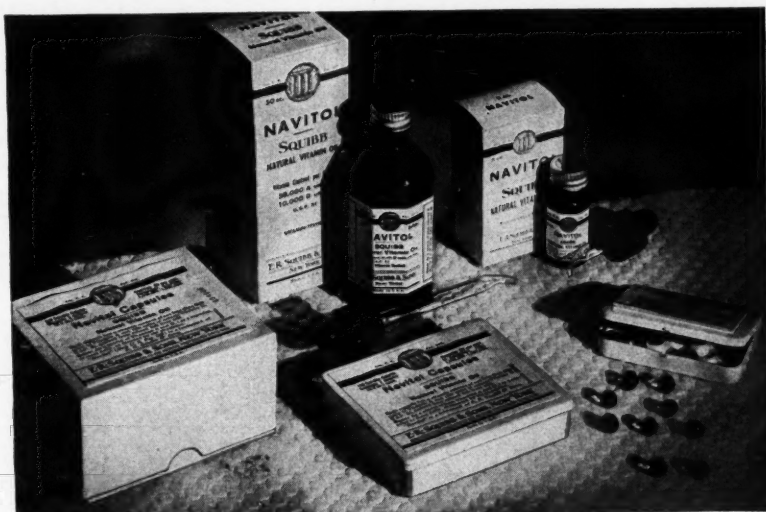
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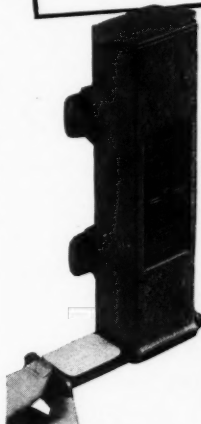
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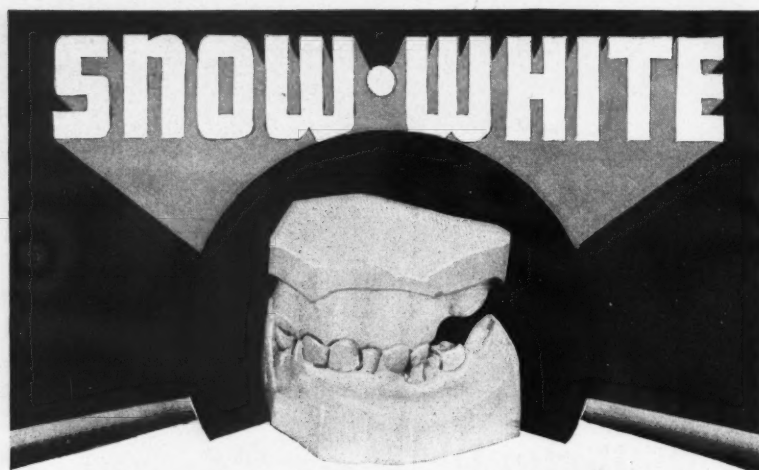
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## Treatment of Maxillofacial War Injuries

(An Adaptation)

[The Journal of the American Medical Association, Foreign Letters (London), 107:1311 (October 17), 1936.]

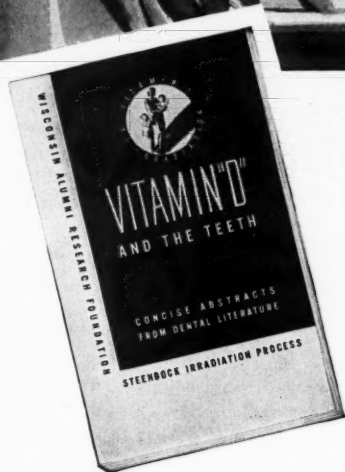
IN 1932 THE British army council appointed a committee to report on the treatment of the wounds of the jaws and face that occur in modern warfare. The subjects investigated were (1) the equipment of hospitals or departments for maxillofacial injuries; (2) methods of treatment, and (3) the training of dental officers in the principles of preliminary treatment in the field.

*Preliminary Treatment*—"... Preliminary treatment would be restricted to life saving and would chiefly be the prevention of suffocation and the arrest of hemorrhage." Loss of control of the tongue would usually cause the suffocation. Because posture is important in preventing obstruction of the air passages, stretcher bearers would be instructed to lay the wounded man on his chest rather than his back, with the head hanging over the end of the stretcher. It is emphasized that the tongue should be kept forward by suturing or clipping if possible, hemorrhage must be checked by plugging wounds external to the mouth and also by digital pressure. At aid posts the throat should be cleared of foreign bodies.

*Treatment by Surgeon*—At the main dressing or casualty clearing stations the surgeons should correct displacement of soft and hard tissues and fix them without undue tension. Catgut sutures should be used if practicable to reduce extent and difficulty of later plastic operations, but overapproximation should be avoided. Drainage should be instituted at the outset to prevent abscess formation.

*Treatment by Dental Officer*—The following must be considered: conservation of injured teeth and loose fragments of bone; and fixation of displaced fragments of jaw in correct position. The extraction of teeth should be considered conservatively, because of their importance in the retention of appliances. "As long as teeth are present in the fragments and in corresponding region of the





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maxilla the dental officer should immobilize the fragments in normal occlusion by interdental wiring. Even if the whole mental region is lost, the molar fragments should be held in occlusion by this means." Broken dentures may be used as splints together with external bandages. Impression composition or gutta-percha may be used inside the mouth to control the fragments. Surgical wiring of fragments is contraindicated in all compound fractures of the mandible.

## Mottled Enamel

(An Adaptation)

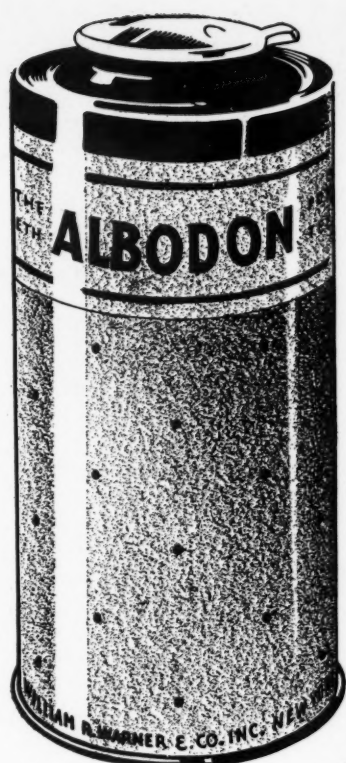
[H. Trendley Dean, D.D.S.: Chronic Endemic Dental Fluorosis, The Journal of the American Medical Association, 107: 1269 (Oct. 17) 1936.]

**Definition**—"The endemic hypoplasia of the permanent teeth known as chronic endemic dental fluorosis, or mottled enamel, is a water borne disease associated with the ingestion of toxic amounts of fluorides in the water used for cooking and drinking during the period of calcification of the affected teeth. The permanent teeth in particular are [permanently] affected . . ."

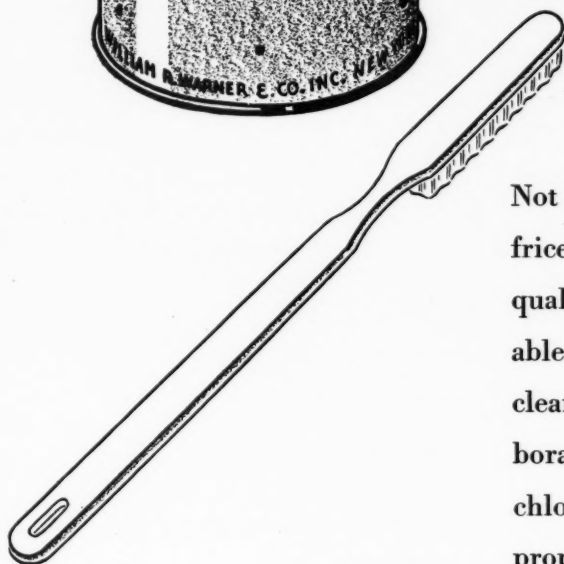
**Appearance**—Because the causative factor of mottled enamel is operative during the period of tooth development, teeth so affected erupt dull-looking rather than glossy and translucent and appear chalky white rather than the normal pale creamy white color. The chalky white often becomes a characteristic brown and the brown stain may increase with age. In severe cases pitting of the surface of the teeth which should be smooth may also be found.

**Prevalence**—Mottled enamel has a world wide distribution. There are 335 endemic areas among twenty-five states in the United States. Most of these are west of the Mississippi River. Texas is affected the worst but the public health problem of mottled enamel is important in Colorado, South Dakota, Arizona, and small Atlantic Coast communities, east of the Allegheny Mountains in Virginia, North Carolina, and South Carolina.

**Etiology**—The etiology of mottled enamel has not been absolutely established; but there is strong evidence that the causative factor is the presence of toxic amounts of fluorine [fluoride] in the drinking and cook-



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ing water during the calcification period of the permanent teeth. In 1931 three independent investigators (H. V. Churchill; M. C. Smith, et al.; and H. Velu and L. Balozet) arrived at this conclusion. Other surveys and experiments in endemic areas seem to confirm the belief that fluorine in the water is the causative factor.

**People and Time Factor**—Race, color, or sex do not seem to be factors in the disease. No such differentiation has been observed. The time factor seems to be limited to the period of calcification of permanent teeth; however, skeletal involvement has been suggested by a few investi-

gators in which case the time factor would have to cover adults.

**Histopathology**—In 1916 Black first reported the absence of cementing between the outer fourth and outer third of the enamel rod. Black found the enamel rod unaffected and the dentine normal. Williams in 1923 confirmed Black's observations and he thought the defective enamel extended to the dento-enamel junction. In 1925 Beust reported that the dentine as well as the enamel was affected. This observation has been confirmed by Ainsworth who also explained the pitting of the surface "as a breaking off of the ends of the

enamel layers weakened by the loss of the interprismatic [cementing] substance." Erausquin reported the permeability of mottled enamel.

**Relation of Other Oral Pathologic Changes**—According to McKay despite the defective structure in mottled enamel teeth there is no greater susceptibility to caries. Attention has also been called to the delayed eruption of the permanent teeth of children in endemic areas. Dean has not been able to confirm this, but does report that in areas of high fluoride concentration there seems to be a tendency toward a higher incidence of gingivitis.

**Incidence**—Incidence and distribution have been found to vary according to fluoride concentration of the water. For purposes of classification the types are given according to severity as normal, questionable, very mild, mild, moderate, moderately severe, and severe. The minimal threshold of toxicity has not been definitely established. Amounts not exceeding one part per million seem to have no public health significance. More than four parts per million of fluorine would be considered relatively high fluoride concentration and in general gives an incidence of 90 per cent in which 35 per cent of the children would be classified as "moderate" or worse.

**Prevention**—1. The disease is preventable if water containing excess fluorides is avoided. This can sometimes be accomplished by changing the source of water supply, from deep wells to nearby rivers, for example.

2. When this cannot be done, the regular source of water can some times be diluted with another water to bring the fluoride content down to permissible limits.

3. Inasmuch as it is only the children up to the age of 8 who are known to need protection, distilled or cistern water may be resorted to for drinking and cooking purposes.

4. The solution in some areas where satisfactory water cannot be made available will have to depend on chemical means for the removal of toxic amounts.



"The Dentist"...  
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# The Mouth with the V-Shaped Roof

it goes with the tapering face and handicaps denture stability

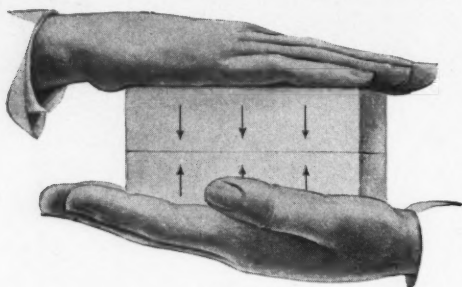


Figure 1

To see how the shape of the mouth affects the ability of a dental plate to stay in place and give good chewing service, imagine that you are pressing two square blocks together with your hands, as in Figure 1. It is apparent that their flat surfaces will meet in a straight horizontal line. They will hold firmly as long as up-and-down pressure is exerted by the hands. They will show no tendency to move out of position.

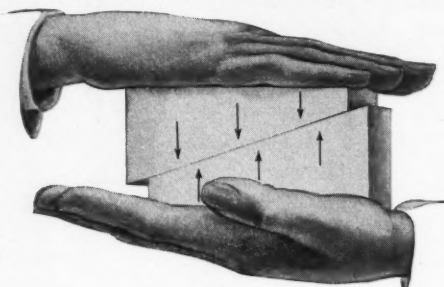


Figure 2

Now imagine that the blocks, instead of being square, are shaped so that they meet at a sharp angle, as in Figure 2. Pressed together with the hands, the blocks will not stay in firm contact. They will show a marked tendency to slip sideways.

## Denture Stability Affected the Same Way

With the simple example of the blocks in mind, it is easy to see how the same principles apply to your dental plate.

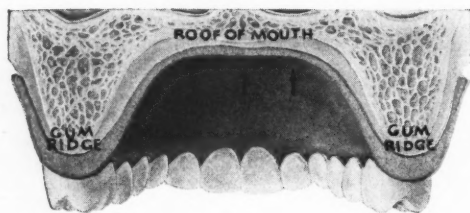


Figure 3

If the roof of your mouth is flat or U-shaped, as in Figure 3, the up-and-down motion characteristic of chewing with dentures will cause your plate to press against the roof of the mouth in a straight, horizontal line. As in the case of the two square blocks, secure support will be provided at every point of contact. Under such favorable conditions, your denture will—even while chewing hard foods—hold firmly instead of slipping out of position with every bite.

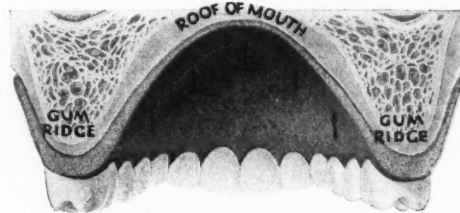


Figure 4

But if your mouth-roof is "peaked," or V-shaped, as in Figure 4, your denture will probably act much the same under chewing pressure as do the angled surfaces of the blocks shown in Figure 2. Every motion of chewing will force the denture against the slanting, yielding sides of the V-shaped mouth-roof at an angle, and it will naturally show a tendency to move out of position and impair chewing efficiency.

The foregoing facts should make you realize that the mouth with the V-shaped vault presents the dentist with a more difficult problem than the mouth with the U-shaped vault and that the successful solution of your denture problem will depend on patient cooperation with your dentist.



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## The Publisher's Notebook

THIS MONTH THE magazine appears in a completely new dress. The size and general style remain unchanged, but the type-dress is new and the cover is new. Robert Stumpf, of New York, who redesigned the book for us, has chosen a more pleasing type-face for headings; his choice of type for text columns was governed by the desire to produce utmost legibility: the new text type was designed by its maker to eliminate eye-strain so far as possible. Oculists have approved it as scientifically correct.

The new cover was created by Dorothy Sterling of the ORAL HYGIENE PUBLICATIONS staff. Readers whose hobby is photography will be interested to know that the bas-relief effect achieved in the title and in the monogram was produced photographically. The title and the monogram were lettered in black and white, without shading of any sort. Then an ordinary photograph was taken of the pen-and-ink lettering. From the negative a positive was made on lantern-slide glass; then the lantern-slide positive was used to make a negative, also on lantern-slide glass.

The next step was to lay the positive slide upon the negative slide—not matching the lettering exactly, but placing one slide slightly "out of register" with the other. A photographic print was then made of the combined negative and positive slides. This sounds fairly easy; it really isn't. For one thing, care must be exercised in making the exposures, and in developing and printing, to obtain gray tones in the lettering, rather than strongly contrasting blacks and whites.

Editorially, the magazine is unchanged. The physical changes were made (and other physical changes will be made occasionally in the future) because of our belief that any journal's format becomes tiresome if continued too long. This, then, is



## Get the *patient's* point of view

When did you last have a cavity prepared, doctor? You know the value of adequate dental care. But do you have dental work done willingly or do you dread the pain, the discomfort, the nerve-racking grinding sensation that you must experience when cavities must be prepared?

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the 1937 "model" and I hope everyone will like it.

Last September, THE DIGEST's companion publication, *Oral Hygiene*, was completely redesigned. Robert Stumpf did that for us, too, and *Oral Hygiene's* new cover, too, was the work of Dorothy Sterling. This month another of our papers, *Spanish Oral Hygiene*, also appears in a brand-new format. Incidentally many DENTAL DIGEST articles are translated for the Spanish edition, which reaches the profession in the twenty countries of Latin America. Digest authors are usually thrilled when they receive copies of the Spanish magazine carrying their articles printed in a language they cannot read. Not infrequently our office acts as a clearing house for correspondence between Latin-American dentists and American dentists whose articles have led the former to seek more information.

THIS ISSUE is the largest ever published. THE DIGEST has grown steadily since it was reborn five years ago, in January, 1932. In that period the paid circulation has doubled, and the growing advertising patronage is making possible an expanding editorial program. One evidence of that is the series started this month, "What Twelve Hundred Patients Know About Dentistry." As readers will discover, this represented a great deal more work and expense than the average seven-page article. While the series, which continues through the April issue, has nothing to do with technical procedures—to which the magazine is almost exclusively devoted—it is an extension of THE DIGEST's secondary mission: the education of the dental patient.

Incidentally, this month we publish another color chart in the series, "The Education of the Dental Patient." This chart series has been very much more popular than we dared hope. For use at the chair (and in the reception room) the profession has purchased more than twenty-two thousand chart booklets and a small but steady demand for them still continues.

The articles starting this month, on "What Twelve Hundred Patients Know About Dentistry," provide a comprehensive picture of the public's thinking about dentistry—reveal many opinions which the average patient would be unwilling to voice

# *A Nourishing Protective Diet*

## *. . . while Gums are Healing*

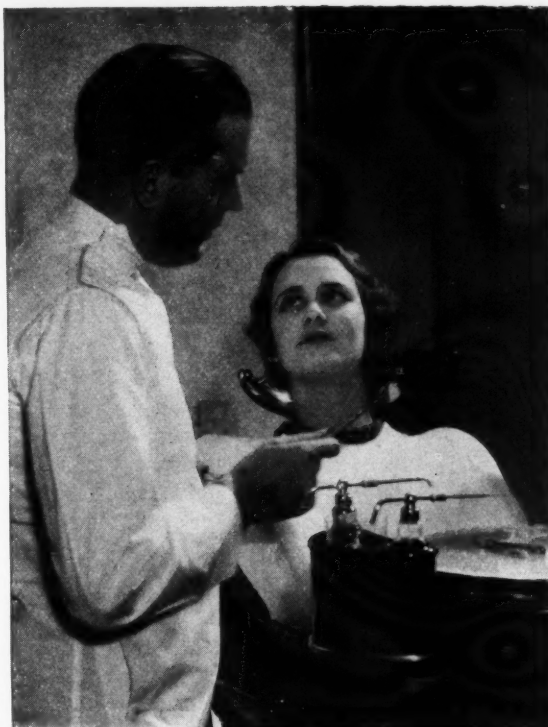
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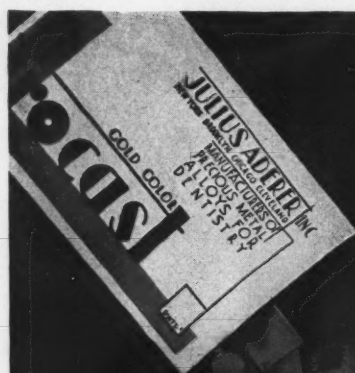
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PROCAST may be softened by being plunged in water or acid. It may be hardened and toughened to the desired degree by slow cooling in air or under cover, the result depending on the rate at which it is cooled from dull redness.

PROCAST is essentially a better gold alloy for better gold cases. Use it in your office or specify it to your laboratory.

#### Many Uses

For partial dentures • with any cast clasp • with any wire clasp • with any bar or saddle design • for thin palatal castings • for removable bridgework • for inlays • for  $\frac{3}{4}$  crowns • for pinlays • for full cast crowns • for occlusal castings to raise the bite • for fixed bridgework.

\$2.07 dwt., at your dealer

#### JULIUS ADERER, Inc.

115 W. 45th STREET, NEW YORK  
4 COURT SQUARE, BROOKLYN  
55 E. WASHINGTON ST., CHICAGO  
1422 EUCLID AVE., CLEVELAND

### IDEAL FOR THE GENERAL PRACTITIONER AND THE MAN WHO SPECIALIZES

*Dental Oral Surgery* really offers a postgraduate course in textbook form. It describes in complete detail the invaluable technique of the author, Doctor Wilton W. Cogswell. This is a book for the progressive man; it is ideal for both the general practitioner and the man who specializes. The price is \$10. Order your copy at once.

#### THE DENTAL DIGEST

1005 Liberty Ave.

Pittsburgh, Pa.

in conversation with his dentist. This freedom of expression is, I think, the most important characteristic of these articles. The patients who participated addressed the editor directly; their dentists did not see their comments. Thus, for the first time I believe, the profession will have an opportunity to discover what patients really think about numerous phases of dental practice. Candor has been given a free rein.

COMMENTING ON THE Notebook column appearing in the October number, a New York state dentist wrote last month:

"... your whole magazine is so good that I had never realized that some people might not like it and might not renew their subscriptions. Your article has had a bad effect on me, for, now that I know that others do so, I am going to criticize your magazine.

"One source of pleasure to me is my dental library. I like to bind my magazines so that they are easier to refer to, and so they look better. Why do you insist on making us bind the advertisements? I realize, of course, that reading matter is scattered through the advertising pages in an ordinary magazine so that the reader will turn over the pages and see the advertising, but is this necessary in a professional magazine? Any dentist who is progressive enough to want to take a good dental magazine is also progressive enough to want to keep up to date in the new things that manufacturers have to offer. I'll bet that the advertising pages of the average professional magazine get a better going over than the subject matter. Why then is it necessary for us to fill the shelves of our library with these ads? They have done their duty and each month are replaced by new copy..."

In our response to the doctor, I said: "Thanks for liking *THE DIGEST* and thanks for criticizing it, also. Criticisms are always welcome around here, for we do a great many things wrong and shall until we die and constructive criticism often helps us to raise our average of performance.

"Our editorial director, Doctor Ryan, will love your letter because he too is opposed to the idea of printing any text in *THE DIGEST* advertising section. In *Oral Hygiene*, for many

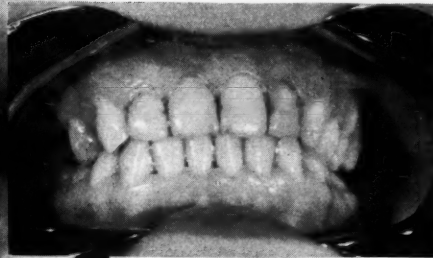
# IMPROVEMENT IS RAPID

## When Patient is taught MASSAGE BRUSHING



**SEPTEMBER 16th**

Condition of gingivae when patient came to dentist. Inflammation due to venous congestion in upper and lower gingivae. Patient instructed in massage brushing.



**OCTOBER 14th**

Case after 4 weeks of regular massage brushing. Note clearing up of marginal gingivitis and elimination of hypertrophy of interproximal papillae.

### Nutrient Blood Rushes to Gingival Tissues when the Venules are Emptied

**M**ODERN soft foods do not exert enough pressure against capillary loops to effect venous drainage. Circulation slows down not only in gingivae, but also in teeth and deeper lying structures.

But circulation is unblocked when venules are emptied by brush massage. Parts are suffused with arterial blood. Health is aroused, resistance is raised in both tissues and teeth.

Massage brushing is plainly called for in periodontal cases after local irritants have been removed. More and more dentists are also showing their patients how to use it to keep the resistance of gingivae and teeth at a high level.



**THIS KIT-60¢ VALUE-15¢**

### Contains Equipment Needed for Massage Brushing

**H**ERE, in handy kit form, at less than cost, are the materials needed for massage brushing—for chair treatments or for instructing patients. Each kit contains: 50¢ Calsodent Brush of proper design with base-end cut Chungking bristles which retain resilience longer when wet; 10¢ bottle of Calsodent which makes 2½ quarts of solution needed for safe, pleasant massage brushing; 12-page booklet which explains massage brushing in everyday English. Kits to profession only, 15¢ each. Sorry, not more than 3 dozen at a time.

CALSODENT CO. Inc., 215 Fourth Ave., New York City

Please send me.....kits at your special price to dentists of 15¢ each. Each kit is to contain: a 50¢ Calsodent Brush of special design for massage brushing with base-end cut Chungking bristles; also a 10¢ bottle of Calsodent which makes solution needed for safe, pleasant massage brushing.

☐ Check enclosed

☐ Send C.O.D.

Name .....D.D.S.

Address .....

City .....State.....

DD-1-37

☐ Kindly send me free of charge a copy of your 20-page Manual on Massage Brushing.

## SPECIAL OFFER

For thorough, rapid, gentle prophylaxis Young's polishing cups and specialties are superior! To induce you to try them we offer this \$4.10 value at \$2.50 FOR A LIMITED TIME ONLY. ACT NOW! Send no money—but mail coupon today. We will ship through your dealer.

1 Medicator & Masseur.....	\$1.00
6 M. & M. Rubber Cups.....	.35
36 assorted Polishers.....	1.80
1 YCO Mandrel (HP).....	.20
1 YCO Mandrel (RA).....	.20
1 Young's Mandrel (HP).....	.05
2 Young's Mandrel (RA).....	.20
1 Mixing Tray.....	.25
12 Prophylaxis Sticks.....	.05
TOTAL VALUE \$4.10	
FOR LIMITED TIME ONLY \$2.50	
YOU SAVE \$1.60	



### YOUNG DENTAL MFG. CO.

4958 Suburban R. W., St. Louis, Mo.

Gentlemen: Kindly send me a Young's Prophylaxis Kit together with full literature and reprints on use of these instruments, complete, at your special offer of only \$2.50.

Name \_\_\_\_\_ Address \_\_\_\_\_

Dealer \_\_\_\_\_

(Or please use coupon on page 55)

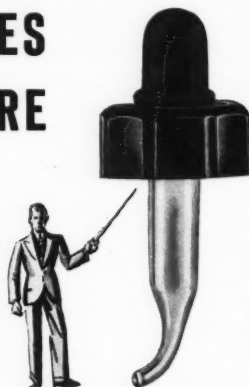
The coupons on pages 54-55 are for  
your convenience when writing  
to advertisers

## AMES ALONE PROVIDES THIS SAFETY FEATURE



BOTTLES of Ames Cement liquid now are equipped with a new dispenser that includes an exclusive feature providing far more protection against deterioration of liquid than heretofore has been available. Contamination and evaporation of the liquid, which always have been serious hazards in the use of any cement, are practically eliminated by this new Ames dispenser.

Dental cement liquids wet the ordinary forms of rubber, the liquid crawls and creeps until a messy condition results inside of the cap. This remarkable Ames dispenser is a dropper-fitted screw cap, the sealing surface of which has received a special treatment that repels the liquid instead of being wetted by it as with other dispensers. The liquid is the vulnerable part of any cement, and proper protection and cleanliness are absolutely necessary. With this new Ames dropper better protection for the liquid is assured and better cementations will result.



The liquid-repellent seal protects purity and prevents contamination.

THE W. V-B. AMES COMPANY  
Fremont, Ohio

# AMES DENTAL CEMENTS

years, we have kept advertising and text separate, and we started out with THE DIGEST on the same plan. But DIGEST pages are so large that when you group several fractional page advertisements on a single page—not separating them by text—the result is a mess.

"Accordingly, a year or so ago we changed the makeup of the advertising section to include columns of text on such pages, but the editorial office has forbidden the publication office to continue any main articles into the advertising section. Instead, as you may have noticed, they provide us with what is termed 'filler material' for such use. Thus, the main articles are kept intact and could be bound separately.

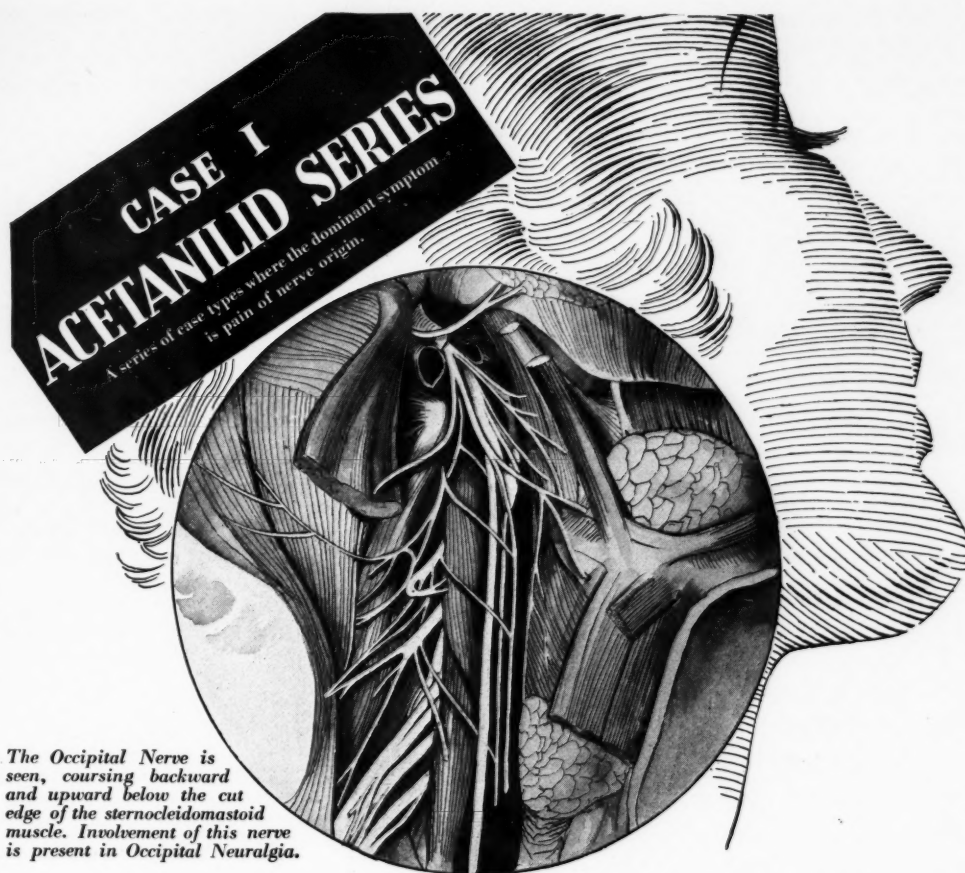
"In years to come, though, I believe that the bound volumes of any dental magazine will be more interesting if the advertising is included along with the text, because a good deal of dental history is written in the advertising section. This is exemplified by some of the old volumes of *The Dental Cosmos* as well as some of the early volumes of THE DENTAL DIGEST—published long before we took over the magazine."

The doctor also suggested printing the annual index as a separate sheet, for binding in the front of yearly volumes, rather than printing it at the end of the December editorial section. We will do that for the present, 1937, volume.

IN FORTY-TWO YEARS the destinies of this journal have been administered by five different editors. The first was Doctor Allison W. Harlan who put together the first issue, in January, 1895. He was succeeded some time later by Doctor D. Howard Crouse who served until his death in 1906, when Doctor J. P. Buckley became editor. Doctor Buckley retired in 1909 when Doctor George Wood Clapp was appointed. Doctor Clapp edited the magazine for twenty-three years, until Doctor Edward J. Ryan succeeded him in January, 1932, when the paper was taken over by our organization, and became an ORAL HYGIENE PUBLICATION.

But, although forty-two years is a long period of dental history, THE DIGEST is not the oldest dental magazine. Until it was merged this month with the *Journal of the American Dental Association*, the seventy-





The Occipital Nerve is seen, coursing backward and upward below the cut edge of the sternocleidomastoid muscle. Involvement of this nerve is present in Occipital Neuralgia.



## CCIPITAL NEURALGIA

**CHIEF COMPLAINT:** Paroxysmal pain with free intervals; tenderness of neck toward right ear.

**HISTORY:** Frequent colds; lack of energy; appetite poor; sleeplessness, and irritability.

**PHYSICAL:** Underweight; anemic; neurasthenic type.

**SYMPTOMS:** Hyperesthesia right cervical area midway between occiput and mastoid process.

**DIAGNOSIS:** Occipital neuralgia caused by exposure or infection.

**TREATMENT:** (Symptomatic) Acetanilid, 2-5 grains q. 4 hrs.

Bromo-Seltzer provides 3 to 3.5 grains of Acetanilid, plus its synergists—Caffeine and Bromides—in each teaspoonful dose. Caffeine gently invigorates the mental processes. Bromides promote relaxation of overwrought nerves. Citrates improve digestion, tend to replenish alkaline reserve and give to Bromo-Seltzer its effervescent palatability.

Bromo-Seltzer relieves pain effectively and economically.

*Requests for sample and literature receive prompt consideration.*

**EMERSON DRUG COMPANY · Baltimore, Md.**

*(Please use coupon on page 55)*

# Cook County Graduate School of Dentistry

(In affiliation with the COOK COUNTY GRADUATE SCHOOL OF MEDICINE)

## ANNOUNCES

The Cook County Graduate School of Dentistry in Chicago provides a course of post-graduate instruction of a kind never available to dentists. The program of instruction is consistent with the newer attitude toward dental instruction.

The course is given by the members of the Cook County Graduate School of Medicine who are members of the attending staff of the Cook County Hospital, and many of these men hold chairs in the medical and dental schools of Chicago.

A one month intensive post graduate course is scheduled to start May 1, Aug. 1, and Nov. 1. For circular giving full information address

REGISTRAR, 427 S. Honore St., Chicago, Ill.



**S**AY good-bye to Mr. Alibi when he tries to sell you mounted points that are "just as good" as Siltex Dentstones. Your better judgment tells you, as no doubt your friends already have,

**No dentist ever regrets using**

# SILTEX DENTSTONES

The cool cutting, economical mounted points

**Mu-col**

USED FOR 20 YEARS IN DENTAL PRACTICE—  
at the chair to increase mouth comfort; in post-extraction treatment to aid normal granulation and relieve pain; as a general mouth wash; to banish fetid breath; to clean dentures and relieve soreness resulting from their use.

MU-COL is a balanced saline, alkaline prophylactic. Powder form, does not deteriorate. Quickly soluble.

—THE MU-COL COMPANY, Dept. DD-17, Buffalo, N. Y.—

Please send free testing sample, sufficient to make 6 qts. MU-COL solution. I enclose my card or letter-head.

Name ..... D.D.S.

Address .....

eight-year-old *Dental Cosmos* held that honor. Now the oldest journal is *Dental Items of Interest*, just entering its fifty-ninth year. Its editor, Doctor R. Ottolengui, has unquestionably served longer than any other in the field.

**SPEAKING OF DENTAL history**, Doctor Seth W. Shields, III, who contributes to *Oral Hygiene* frequently, is the youngest of three generations of dentists, all of whom are still in practice, including his grandfather, Doctor Seth W. Shields; his father, Doctor H. S. Shields; his uncle, Doctor S. W. Shields, II.

This month in *Oral Hygiene*, Doctor Shields, III, contributes "Lower Plates for Three Generations." He says, "Of three generations . . . Grandpa Shields alone is able to make a lower plate that will work," then presenting the technique employed by his grandfather.

MERWIN B. MASSOL, *Publisher*

## TO THE EDITOR

I AM ENCLOSING an envelope (see accompanying illustration) which I have had made to carry out the age old idea of the good fairy that brings a dime if the little girl or boy is a good extraction patient.

The idea has been successful in my office and I would like to pass it along to the profession.



The Little Fairy, who's as kind as can be  
Said, "Please, Dr. Denby, do something for me;  
Tell each little Boy and each little Girl  
Who has you take out a wee tooth of pearl  
That if under their pillow they hide it away  
There'll be a real dime in its place next day"  
So here's the wee tooth—all safe and alright  
And I'm sure the Good Fairy will be 'round tonight!

Incidentally, a duplicate envelope containing a dime is given to the parent and it is surprising how the parents, too, approve of the idea.

—MAURICE A. DENBY, D.D.S., *Warren, Rhode Island.*



**FIGHT CANCER WITH KNOWLEDGE** . . . Under this slogan the women of America are uniting in the first national campaign to fight cancer and its allies, fear and ignorance—uniting in a mighty effort to save human life.

Cancer can be cured if discovered in time. Perhaps as many as half the 140,000 persons who die of it each year can be saved by the spread of truth and knowledge.

*March with us in this great Crusade!*

**WHAT YOU CAN DO TO HELP**

*Enlist in the Women's Field Army. Send \$1 to the American Society for the Control of Cancer today. Seventy cents of your dollar will be spent by your State Division in cancer control work.*

**WOMEN'S FIELD ARMY**

American Society for the Control of Cancer  
1250 Sixth Avenue, New York City



# 30

Lochhead celebrates  
30 years  
of Porcelain Service

When James D. Lochhead opened shop in New York in 1907, porcelain prosthetics was a relatively crude art, faced by numerous obstacles. Today, many of those obstacles no longer exist, and Lochhead Laboratories feel duly proud of the part they have played in overcoming these handicaps.

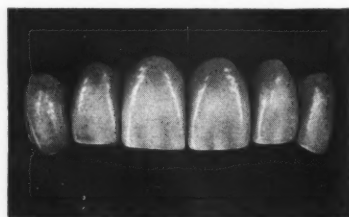
## Many contributions

Lochhead was among the first to adopt high-fusing porcelain for all its restorations. Lochhead porcelain inlays and jacket crowns are recognized today as man's closest approach to human tooth structure. Lochhead has also recommended Vitaporax porcelain for its opaque qualities. And Lochhead is now producing porcelain's strongest bridge—the torque resisting bridge—and its many variations.

## The moving spirit

Since the pioneering days of James D. Lochhead, porcelain has come a long way. That drama of progress, however, is still being enacted and in it Lochhead Laboratories, Inc., as in the time of its founder, continues to be the moving spirit.

★ ★ ★



## Lochhead Laboratories, Inc.

NEW YORK, N. Y. 115 West 45th St.	CINCINNATI, OHIO 939 Enquirer Building
BOSTON, MASS. 120 Boylston St.	LOS ANGELES, CALIF. 512 Hillstreet Bldg.
CHICAGO, ILL. 5 East Washington St.	MONTREAL, CAN. 1414 Drummond St.

## DENTAL MEETING DATES

North St. Louis Dental Society, eighth annual meeting, Chase Hotel, St. Louis, January 27-28, 1937.

Philadelphia County Dental Society, annual meeting, Benjamin Franklin Hotel, Philadelphia, February 3-5, 1937.

The 1937 meeting of the United States Section of the International College of Dentists, Stevens Hotel, February 14, 3:00 P. M.

Chicago Dental Society, seventy-third annual midwinter meeting, Stevens Hotel, February 15-18, 1937.

University of Buffalo Dental Alumni Association, regular meeting, Hotel Statler, Buffalo, February 24-26.

Kings County Dental Society, twenty-fifth annual meeting, Towers Hotel, Brooklyn, February 17-20.

Five State Dental Post Graduate Clinic, Wardman Park Hotel, Washington, D. C., March 7-10.

American Society for the Advancement of General Anesthesia in Dentistry, regular meeting, Tower Room, Hotel Montclair, New York City, March 22.

Louisiana State Dental Society, fifty-seventh annual meeting, Roosevelt Hotel, New Orleans, April 8-10.

Alabama State Dental Association, sixty-eighth annual meeting, Battle House Hotel, Mobile, April 12-14, 1937.

American Society of Orthodontists, thirty-fifth annual meeting, Edgewater Beach Hotel, Chicago, April 19-22, 1937.

North Carolina Dental Society, sixty-third annual meeting, Carolina Hotel, Pinehurst, May 3-5, 1937.

Dental Society of the State of New York, sixty-ninth annual meeting, Waldorf-Astoria, New York City, May 4-7.

Pennsylvania State Dental Society, sixty-ninth annual meeting, William Penn Hotel, Pittsburgh, May 4-6, 1937.

Tennessee State Dental Association, seventieth annual meeting, Knoxville, May 10-13, 1937.



## HU-FRIEDY Leads Again - - - -

### The ORAL SUN LIGHT

A headlight with the brilliancy of the sun conveyed to the orifice of the mouth. Economy in maintenance and durability in construction are added features of this very efficient illuminating equipment.

A cool lamp has been provided for by the two cylinder reflectors, both of which are open spaced, with the spaces overlapping each other, so as to confine the light, and still maintain ventilation.

A ground optical lens covers the opening of the cylinders. This will condense the focus, which concentrates the actual candle-power of the bulb. The focus is adjustable, in the same manner as that of a telescope. A soft leather band, cushion padded, renders comfortable carriage when in use.

The complete equipment consists of ten feet of rubber covered wire cord, and a transformer, which operates on A. C. only. Additional cord can be furnished upon request. Furnished on ten days' trial—price —\$15.50.

The bulb is of standard type, as used in automobiles, and retails for 25 cents.

## HU-FRIEDY MFG. CO.

3118 N. Rockwell St., Chicago, Ill.

Name.....  
Address.....  
City.....State.....  
Dealer.....

(Or please use coupon on page 55)

## SUGGESTIONS TO CONTRIBUTORS

**PUBLICATION PREROGATIVE:** Articles and illustrations are accepted for publication on condition that they are contributed solely to this magazine.

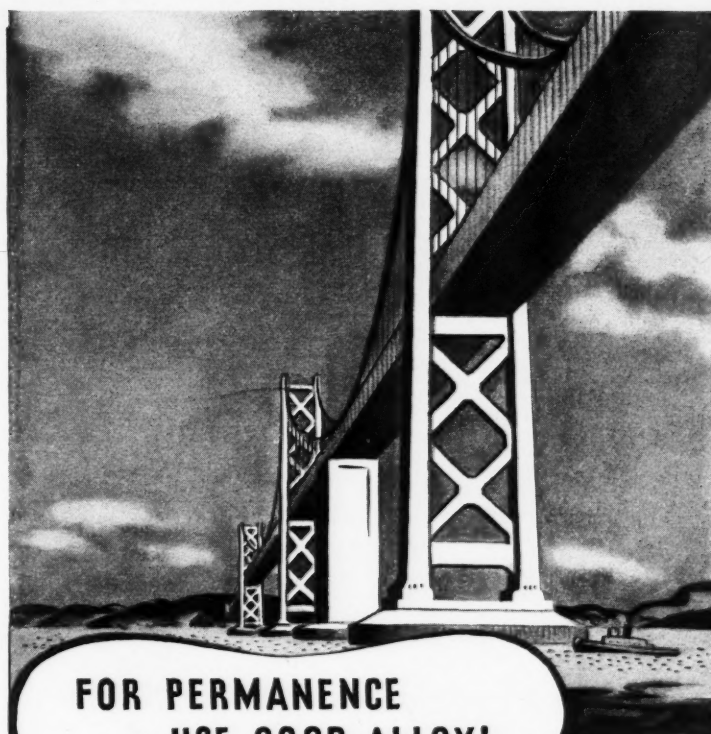
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**MANUSCRIPTS:** Manuscripts should be typewritten, double-spaced, and the original, not the carbon copy submitted. Footnotes and bibliographies should have a definite connection with the article and should be specifically referred to in the article. To be of value to readers, bibliographic references should contain complete information in the order given: name of author, title of article, name of periodical, with volume, page, month—day of month if weekly—and year. In the case of books: name of author, title, edition, volume, place of publication, name of publishers, year, pages. Manuscripts should not be rolled.

**ILLUSTRATIONS:** Drawings and photographs should be plainly numbered on the backs according to the sequence in which reference is made to them in the article. The author's name should be written legibly with soft pencil on the back of each illustration, and in case of possible doubt, the word "Top" to designate the top of the illustration. In the case of roentgenograms, the negatives are preferred for reproduction; in the case of photographs, glossy prints about 12 by 8 inches in size. Paper clips should not be used on illustrations, especially on negatives. Line drawings should be made in black on white paper that does not blot. Color work must be of a particularly high quality to be acceptable. All illustrations should be clear and distinct and large enough so that details will not be lost if reduction in size is necessary.

**EDITING:** Authors should not feel that they are being discriminated against or personally criticized when changes are made in the wording or spelling of their manuscripts or if parts are deleted. A minimum of editing is necessary in all cases—if for no other reason than to make grammatical corrections, and sometimes one article will require more revision than another. The reason for this is obvious. Every magazine has its peculiar style in matters of arbitrary spelling, in its general tone, in its form of presentation. The *Digest* favors a compact, terse, simple style, with outlining wherever possible, and many illustrations. Wordy, padded articles, with extraneous and irrelevant matter and florid writing will necessarily undergo considerable editing to make them conform to our style of succinct, purposeful writing. It is, however, at all times the aim of the editors to preserve the author's meaning and to help him make that meaning clear; the editing is not done for standardization as such.

**ANONYMITY:** Anonymous manuscripts and communications will not be read.



**FOR PERMANENCE  
— USE GOOD ALLOY!**

Completed! . . . This super structure, stretching across San Francisco Bay . . . with the skill of modern science and with *good materials judiciously employed*. In building the longest bridge of all times it was important to choose materials designed by man to withstand the stresses and strains to which it will be subjected.

Lasting fillings, likewise, demand the choice of faultless materials—materials made to withstand the changes in physical properties due to the multiplicity of variables present in restoring with amalgam. MINIMAX ALLOY NO. 178 is fabricated to meet alloy specifications, not only under careful laboratory tests *but also under varying technics common in dental practice*. That is perhaps, why more and more dentists from year to year are choosing MINIMAX ALLOY NO. 178. Your money back if you do not say, "It's better!"

**The MINIMAX Co.**

MEDICAL & DENTAL ARTS BLDG., CHICAGO

IN 5 OZ. BOTTLES	IN 1 OZ. BOTTLES
5 ozs.....\$1.50 per oz.	1 oz.....\$1.60
10 ozs..... 1.40 per oz.	5 ozs..... 1.55 per oz.
20 ozs..... 1.35 per oz.	10 ozs..... 1.45 per oz.



**YOU GET  
MORE  
—YOU PAY  
LESS.**

Complies with A.D.A. Specifications No. 1. Filings suitable for alloy-mercury gauges

## STAINLESS STEEL FOR ENDURANCE

Stainless steel laboratory tweezers are acid and rust proof. They'll last longer—remain clean, bright and serviceable long after ordinary tweezers have become useless. In four types at your dental dealer for all gold and porcelain work where heat and acid resistance is desirable.



No. GS Slide lock 6 "	\$1.00	No. JS Plain 6 "	.....\$ .90
No. KS Slide lock 4 3/4 "	.90	No. DS Plain 4 3/4 "	..... .75

**BUFFALO DENTAL MFG. CO., Kehr & Urban Sts., Buffalo, N. Y.**

See second cover D.D.1  
 GENERAL ELECTRIC X-RAY CORP.  
 Please send catalog on the CDX  
 Model E. Also explain convenient de-  
 ferred payment plan of purchase.  
 Dr. ....  
 Address .....  
 Dealer .....

See page 1 D.D.1  
 WERNET DENTAL MFG. CO.  
 882 THIRD AVE., BROOKLYN, N. Y.  
 Please send free supply of Dr. Wer-  
 net's Powder as mentioned.  
 Dr. ....  
 Address .....  
 City .....

See pages 2-3 D.D.1  
 WILLIAMS GOLD REFINING CO.  
 BUFFALO, N. Y.  
 Please send complete information  
 concerning "Klondiker" Inlay Gold.  
 Dr. ....  
 Address .....  
 City .....

See page 5 D.D.1  
 BRISTOL-MYERS COMPANY  
 INTERNATIONAL BLDG., NEW YORK CITY  
 Please send supply of Ipana for  
 clinical use.  
 Dr. ....  
 Address .....  
 City .....

See page 33 D.D.1  
 E. R. SQUIBB & SONS  
 SQUIBB BLDG., NEW YORK CITY  
 Please send literature on Navitol.  
 Dr. ....  
 Address .....  
 City .....

See page 34 D.D.1  
 C. V. MOSBY COMPANY  
 3523 PINE BLVD., ST. LOUIS, MO.  
 Please send me the following books,  
 charging my account .....  
 .....  
 Dr. ....  
 Address .....  
 City .....

See page 35 D.D.1  
 EASTMAN KODAK COMPANY  
 345 STATE STREET, ROCHESTER, N. Y.  
 Please send me "Dental Radiography  
 and Photography" without obligation.  
 Dr. ....  
 Address .....  
 City .....

See page 37 D.D.1  
 WISCONSIN ALUMNI RESEARCH  
 FOUNDATION, MADISON, WISCONSIN  
 Please send free booklet mentioned in  
 ad.  
 Dr. ....  
 Address .....  
 City .....

See page 38 D.D.1  
 THE OHIO CHEMICAL & MFG. CO.  
 1177 MARQUETTE STREET, CLEVELAND, O.  
☐ Please mail authoritative articles on  
 Analgesia.  
☐ I am now using Nitrous Oxid.  
☐ I am considering using Nitrous Oxid.  
 Dr. ....  
 Address .....  
 Dealer .....

See page 38 D.D.1  
 LEE S. SMITH & SON MFG. CO.  
 7325 PENN AVE., PITTSBURGH, PA.  
 Please send me:  
 1 box Certified Compound, \$ .50.  
 6 boxes Certified Compound, \$2.60.  
 Dr. ....  
 Address .....  
 Dealer .....

See page 40 D.D.1  
 KELLY-BURROUGHS LABY.  
 143 N. WABASH AVE., CHICAGO, ILL.  
 Please send information concerning  
 Kelly's Paste.  
 Dr. ....  
 Address .....  
 Dealer .....

See page 41 D.D.1  
 THE ANACIN COMPANY  
 CHICAGO, ILL.  
 Please place my name on your list  
 for your free Monthly Anacin service.  
 Dr. ....  
 Address .....  
 City .....

See page 43 D.D.1  
 MCKESSON APPLIANCE CO.  
 TOLEDO, OHIO  
 Please send me literature on Mc-  
 Kesson analgesia.  
 Dr. ....  
 Address .....  
 Dealer .....

See page 42-43 D.D.1  
 FASTEETH, INC., BINGHAMTON, N. Y.  
 Please send booklet DENTURE  
 CLOSEUPS mentioned in ad.  
 Dr. ....  
 Address .....  
 City .....

**WILSON'S**  
**CO-RE-GA**  
(POWDERED)

*The Perfect Adhesive for Dentures*

« Immediately after a patient is  
supplied with artificial dentures  
the use of CO-RE-GA is indi-  
cated; to help create confidence  
in the ability to wear them with  
satisfaction and to dispel any  
mental uneasiness or fear of the  
dentures becoming displaced »

DENTISTS-FREE SAMPLES FOR YOUR PATIENTS

PLEASE SEND FREE SAMPLES FOR PATIENTS

Dr. ....

**COREGA CHEMICAL CO.**  
 208 ST. CLAIR AVE. N.W.  
 CLEVELAND OHIO, U.S.A.  
*This Coupon is for Dentists use only*

*Mail Coupon*

CO-RE-GA is not advertised to the public.